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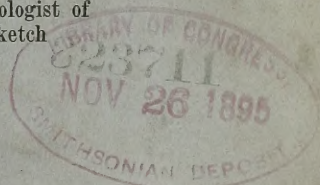
CENTRAL AUSTRALIAN

EXPLORING EXPEDITION, 1889,

UNDER COMMAND OF W. H. TIETKENS.

Despatched by the Central Australian Exploring and Prospecting Association, Limited, under the auspices of the Royal Geographical Society of Australasia, South Australian Branch.

Together with map; List of Botanical Specimens, described by Baron Sir Ferd. von Mueller, K.C.M.G., F.R.S., &c., and Professor R. Tate, F.L.S.; also Catalogue of Geological Specimens, described by H. Y. L. Brown, F.G.S., Govt. Geologist of South Australia; with Geological sketch of the Country passed over.



Adelaide:

C. E. BRISTOW, GOVERNMENT PRINTER, NORTH-TERRACE.

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EXPLOREMENT

AND DEVELOPMENT

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COMMISSION, PERTH, WESTERN AUSTRALIA.

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The journey of about 1,054 miles from Adelaide to Bond Springs was of an uneventful character. The camels to be used upon the expedition, belonging to Messrs. Chewings, were in readiness at the Peake, which is the present terminus of the railway line from Adelaide, and as the greater portion of the stores were lying at Bond Springs, having been left there by the first expedition when recalled to Adelaide, the camels were not burdened with stores. From the Finke to Bond Springs the weather was extremely hot, the thermometer for several days recording 172° in the sun, and upon one occasion 178° . The sand was so intensely hot that the camels were unable to stand still during our short halt for midday meals. The heat, dust, and flies by day, and the ants by night, during the last 100 miles of the journey, made life anything but agreeable, and we were thankful when we sighted our temporary home at Bond Springs. We could now fairly anticipate that the hot season would be succeeded by cool weather, and that our journey to the westward would be in the cool season. The stores left at Bond Springs were found to be thrown together in a disgraceful state, and I was much grieved on examining the flour to find our principal article of food for the next four months to be both wevilled and maggotty. During our stay here several men came in from the alluvial goldfields, about seventy miles to the eastward. The largest nugget I saw weighed about 5dwts. These diggers were not particularly sanguine of the success of the new field. The water was fast drying up, and rations were at a ruinous price. At the new township of Stuart there were four stores, and a publichouse was in the course of erection.

At Alice Springs I had the pleasure of meeting with a veteran explorer in the person of John Ross, aged 72 years, who is still hale, active, and strong. Took a number of photographs of the station and neighborhood during my stay here. Having completed the re-packing of the stores, and all the preliminaries having been arranged for a four months' journey, on March 13th, I went down to the Alice Springs telegraph station to forward dispatches and to receive any letters or parcels that might have arrived by the mail which reached there last night. Returned to Bond Springs, which is twelve miles north of Alice Springs. I felt much disappointed

that a supply of seeds and dates promised by the Conservator of Forests had not arrived. A blunder appears to have been made by the Railway Department in misdirecting the parcel. The opportunity now afforded for planting date palms in Central Australia is passed. The experiment would have been both valuable and interesting, as I was anxious to have tested certain localities where I knew good soil and permanent water existed. Date palms in fruit at permanent watering places would prove an inestimable blessing to the famished and wearied traveller in tropical Australia; and nothing would have given me greater satisfaction than to have been favored with the pioneer work of so philanthropic an undertaking.

Thursday, March 14th, 1889.—Bond Springs. The party, consisting of myself, David Beetson, Fred. Warman, a black-tracker (Billy, from the ranks of the native police at Alice Springs), and a small native boy, left the Bond Springs station at 1 p.m. Previous to starting we were all most hospitably entertained at dinner by Mr. R. Taylor, the manager. During our two weeks' stay this gentleman assisted me in every possible way that could be prompted by a kindly nature and a lively interest in the cause of our work.

Our caravan consisted of twelve camels—four for riding, two for carrying water, the remaining six carried loads (averaging 4cwt. each) of provisions estimated to last for nearly four months. They had considerably improved in condition during the journey from Crown Point, and marched off with their burdens with ease. I had decided to follow the north slopes of the MacDonnell Range westerly to Glen Helen station. Travelled three miles west to low, well-grassed, stony hills; then, on a bearing of N. 45° W. for two miles, I now made the tedious ascent of the hills and steered a course west for three miles, which took me to the telegraph line. From here I followed the foot of the main MacDonnell Range for eight miles, on a bearing of S. 76° W., when the Painta Spring was reached at dusk. Travelled seventeen miles through splendidly grassed country, the timber consisting chiefly of bloodwood, mulga, and various leguminosæ of stunted but healthy growth. Magpies and crows were the only birds seen. Bar. 27.820in., ther. 102° in the shade at 1 p.m.; the weather was cloudy and sultry, followed by a smart thunderstorm at 4 p.m.

Friday, March 15th.—Camp No. 1, Painta Springs.—As soon as daylight appeared I proceeded to examine the surroundings, and found the Painta Spring to be a well about 12ft. deep, and blasted out of solid rock at the foot of the ranges, which are of no great elevation at this point. The water, which is of the most excellent description, is raised by means of a windlass and bucket; a line of troughs makes it a very complete and convenient watering place. The overhanging rocks are shaded by beautiful fig trees, which unfortunately were not in fruit; near the well, a handsome

specimen of the *Zamia* palm is growing, but whether indigenous or not I cannot say. Upon my arrival at Alice Springs on the 28th February, I placed my two aneroids beside the standard mercurial barometer at the telegraph station, and Mr. McKay, the officer in charge, kindly adjusted them to it and made hourly comparisons, and up to the time of my leaving on March 12th they were quite consistent; but the short journey here has so affected them that, with the thermometer at 100° in the shade, they show a difference of $\cdot 420$. I propose after this to give the readings of the most consistent, besides keeping a daily record of the differences. Weather cloudy, bar. 27.620in., ther. 102° in the shade at 3 p.m.

Saturday, March 16th.—Camp No. 1, Painta Springs. Bar. 27.729in., ther. 94° .—While at Bond Springs, Fred Warman was bitten by some venomous insect upon the cheek; this swelled up and became so inflamed that it seriously affected his eyesight. I therefore decided not to move the party for a few days, and resolved upon examining the ranges in the vicinity for minerals, sketching in details, and making myself acquainted with the country to the westward as far as practicable. Upon these short journeys I took the black tracker Billy, leaving Warman, Beetson, and the small boy (Weei) at the main camp. Following up the range in a westerly direction for seven miles I came to a pass, which appeared to be much used by cattle. Continuing for two miles I entered upon a saltbush plain, which appeared to be hemmed in on all sides by hills of considerable elevation. A small gum creek traversed it in a northerly direction, which, forcing itself through the range, emptied itself upon the Burt Plain. Travelling south-westerly, in four miles I had crossed this plain, and was face to face with ranges that I found it difficult to travel over with my present light equipment, and which would be quite impassable for the heavily-loaded camels of the caravan. After about three miles of severe stony travelling, I reached the watershed, and a long leading valley took me, in about four miles, to a gum creek flowing southerly towards the Jay Creek. Here I turned the camels out for the night. There was the most luxuriant feed imaginable, and a little water found in the sand was abundant for all requirements. The afternoon and evening had been close, heavy thunder clouds obscured the sky, and there was every indication of a thunderstorm. The following morning broke bright and clear, every sign of rain having vanished. I now took up a south-westerly course, and travelled for six miles over low granite hills, showing basalt, gneiss, and schistose slates. The ranges now became more rugged and precipitous, and, finding it would be quite impossible to bring the caravan this way, I turned north-westerly upon this bearing. I travelled for nine miles over very rough country, the camels with difficulty keeping their feet upon the steep slopes and stony uneven surface. I then struck a small ti-tree creek, following this down I was glad to find myself upon the Burt Plain and good travelling ground.

Wednesday, March 20th.—I returned to the main camp at Painta Springs. Having now abandoned the idea of penetrating the ranges to the southward, I started the following day (21st) to examine the different gorges and inlets of the range, with the hope of finding a watering-place west of the Painta. Travelled north-westerly for two days without making any discoveries of water that would be of any service. I was now forty miles west of my main camp, so started to return. It appears evident that I shall not find the travelling here by any means easy.

Saturday, March 23rd.—Camp No. 2, Painta Spring. Bar. 27·680in., ther. 58°—The morning broke bright and clear though there are still some rain clouds to the S.W. The evening was cold, and I had to get up during the night to renew the fire: it is the first time this season that we have cared to be near the fire at night. The packs having been all rearranged and weighed we cleared away from the Painta Spring at 10·45, taking a N. 85° W. course along the foot of the range. The travelling is simply perfect, level as a bowling green, the weather delightfully cool, so we kept steadily on till dusk when we camped, having travelled eighteen miles. The largest camel that I have, and the one that has caused so much delay and trouble ever since I left the Peake, lay down several times during the day, and by continually breaking his nose rope, caused much loss of time. Kangaroos, wallabies, crows, and crested pigeons seen to day. Travelled about seventeen miles over level ground on the Burt Plain. Timber, principally bloodwood and mulga, and also noticed a few native orange trees (Capparis).

Sunday, March 24th.—Camp No. 3, Burt Plain. Bar. 27·820in., ther. 63°.—Light S.E. wind. Camels not far distant, for their bells are distinctly heard in the still morning air. Started away at 8·45, upon a bearing of N. 86° W.; this course kept us close to the foot of the range, at 1·15 turned direct west towards a dark hill, the most westerly point visible. A remarkable feature in this day's journey was the great number of large ant hills. These structures are built by a small brown ant, and are of all sizes from the tiny edifice just started to the largest size which are 4ft. high, and as much in girth at the base, tapering towards the top. They are of very irregular size and shape, and take the form of slender spires, minarets, and domes, made of the soil from the immediate neighborhood; they are consequently a bright brick red color, and being very numerous give a singular appearance to the landscape. The large ones are immovable, but the small to medium size topple over or break in two when pushed. Heavy thunder clouds passed over from the west in the afternoon, and one or two light showers fell which made it much cooler. Travelled twenty two miles over plains of a red sandy light soil with good loamy soil in places, on which I noticed several varieties of acacia and an occasional orange tree. Camped at 5·15.

Monday, March 25th.—Camp No. 4, Burt Plain. Bar. 27·835in., ther. 66° at sunrise.—At this point the highest peak of a detached range bears N. 22° W, distant about two miles, so that the travelling to-day will be in a valley between the main MacDonnell Ranges which are here about 1,200ft. above the level of the plain, and those which appear to be tending to the north-west. Started from camp at 8·45, N. 83° W.; at three miles came across a crabhole full of water from yesterday's rain, at which I gave all the camels an opportunity to drink which very few availed themselves of. The grass and herbage here was most luxuriant. The morning was fine, cool, and pleasant, but the afternoon close and oppressive; at 3 p.m. so sharp a shower fell that all were glad to get inside their jackets. Travelled nineteen miles, saw a few kangaroos of the red variety. Camped at 5·30 p.m.

Tuesday, March 26th.—Camp No. 5. Bar. 27·900in., ther. 70 at 6 a.m.; cloudy, but cool all night.—This camp is very prettily situated at the entrance of a little glade, and the range being less abrupt, grassy, and more sloping, gave it quite a picturesque appearance. The camels wandered away a considerable distance, and while awaiting their arrival I made the discovery that the quicksilver from an artificial horizon had leaked out and was scattered all over the boxes. Fortunately I had a spare one, and though I collected all the quicksilver I could a great deal was lost. The camels were brought back to their duty at 8·30, and, having spent the night in wandering about in their hobbles, they presented a very sorry appearance. Started at 9·20, N. 80° W. At noon the view to the westward was obstructed by ranges. At 2·45 our course took us through a small gap in the hills, which, by the way, have now lost their imposing and mountainous appearance, though to the southward the heights are to be seen towering above the nearer hills. Fifteen miles from last camp we travelled west down a rough, rocky gorge, which gradually developed into a gum creek that turned away to the N.W. Camped at 6 30, closed in by ranges on all sides. It was too dark to take notice of our new surroundings, but they did not look very bright; the camels when let go looked much disturbed. Noticed the bean tree growing among the rocks upon the slopes of the hills. Travelled eighteen miles. Trees and shrubs seen to-day were mulga, bean tree, ti-tree, and grevillia.

Wednesday, March 27th.—Camp No. 6, West MacDonnell Ranges. Bar. 27·800in., ther. 61° at dawn.—The camel bells were so quickly out of hearing last night that it gave me some cause for uneasiness. At midnight Fred. Warman and I started after them. They were making away for water, and had I left them till morning they would have had such an advance of us that the start would have been much delayed. After much trouble and stumbling about in the darkness they were all collected and brought back, but it was 3 o'clock before we retired to rest. They have

now been four days without water. At dawn they were all collected again. It is evident water must be found for them soon, or the consequences to some of them will be serious. Started Billy away to examine a gorge about a mile or so to the S.E., while Warman and I examined the one where the camp is situated. Billy returned first, with the joyful intelligence that he had found a sufficiency for present purposes. Saddled up, and travelled up a gum creek to its source, and there found among the rocks a small soakage in the sand. The camels were unloaded, and three or four at a time taken up to the water. They drank greedily, returning a second time for more; fortunately there was abundance. This was to me a valuable and most opportune discovery, and, though not a valuable water for a stockholder, a traveller coming from the eastward will always gladly avail himself of the rest and refreshment that it offers. Botanical specimens and rock specimen No. 1 collected. Bar. 27·820in., ther. 102° at 3 p.m.

Thursday, March 28th.—Camp No. 6. Bar. 27·820in., ther. 72° at sunrise.—The morning broke cloudy and cool, a most agreeable change to yesterday's temperature, but later in the afternoon the glass rose to 98°. I went to the top of one of the highest peaks near the camp, and took angles to the most prominent features. A large high range about twelve miles Billy tells me is Mount Sonder, bearing 174°. Another very high point, which I should take to be it, bears 281° 10', distance about fifteen miles. Billy has not been in the neighborhood since he was a boy and admits to a little uncertainty about it. A very distant range with a wedge-like gap between them bears 355° 40'. Ranges are all around, but offer no very distinctive peculiarities. This water is situated some little distance up the gorge or glen, and the approach to it is somewhat obstructed by the boulders and stones in the bed of the creek. Remained here all day for the benefit of the camels. Botanical specimens collected. Bar. 27·80in., ther. 100° in the shade at 3 p.m.

Friday, March 29th.—Camp No. 7. Bar 27·80in., ther. 72° at 10 a.m.—I walked up the gorge to the waterhole and found it much diminished in volume, but there is no doubt plenty more in the sand. The camels were absent without leave, and we did not leave this bright little spot till 10 o'clock. After rounding the point near the camp, I took up a course of N. 30° E. for two and a half miles, when we crossed the Gum Creek, at the head of which our camp was situated. We were now clear of the ranges, and turned N. 45° W. for nearly two miles, when we passed between two little hills. Here I turned N. 60° W. four miles. We were now in the old position again, *i.e.*, with a wall of ranges close to us (south) on one side, and plains on our left of apparently indefinite extent. At 1·30 we changed again to N. 75° W. for three and a half miles; at 2·45, N. 80° W. for seven miles; at 5·20, turned S. 70° W. one and a half miles, and at 6 o'clock camped

for the night. The country travelled over to-day was very similar to that passed over all the way from the Painta Spring, though it is not half so well grassed; indeed it may be said that the surface of the ground is entirely covered with a herb known as buckbush. While this is a valuable food plant for camels, I am not aware that it is so for either cattle or horses, in fact I think it is quite the reverse. The ranges are abrupt, stony, and entirely destitute of timber, excepting perhaps a few stunted pines, and an occasional bean tree will be found at their base and lower slopes. This tree is that from which the natives procure fire by friction, and is extremely light and tough, and should be valuable for many purposes. The ranges appear to be falling off in height, and the fact of being able to do a little southing leads me to believe that I shall soon be able to get through them to the south. We had just got the camp fire strongly ablaze when we were visited by a heavy thunder shower that wetted us through. It passed off in half an hour, and the rest of the evening was pleasant though cloudy: this was to be regretted, for I was anxious to observe for latitude. Travelled twenty miles on all courses. Trees, principally bean trees, grevillia and mulga. A few kangaroos of the red species and an emu were seen. Camped at 6 p.m. on an open sandy grass flat at foot of the range. Obtained specimen of the bean tree, from which the natives make their shields and procure fire.

Saturday, March 30th.—Camp No. 8. Bar. 27·920in., ther. 72° at sunrise.—Started at 8·25 on a bearing of S. 70° W. and in 3½ miles struck a gum creek which apparently came from the southward; where we first met with it the country had been burnt for a considerable distance by the blacks, and many tracks of them were noticed in the creek channel. We followed this creek in its windings south for four miles; its course is through a country that is very pleasing to the eye, the apparently well grassed hills (in reality it is spinifex) the flats dotted with bloodwood which is almost an ornamental tree, the verdure all around give to the scene a most pleasing aspect. This creek, I think, must be the Halleem of Colonel Warburton (?). By midday we had followed it to its source; here I found a nice little pool of water, which, however, we did not avail ourselves of. I now turned on a course of S. 54° W., but the bearings here must be regarded at best as very approximate to-day, for the hills I have now entered into are most difficult to make any headway in; kept on this bearing for about two miles and then turned south for four miles, when we found ourselves clear of the hills and upon a well grassed flat that appeared to extend a considerable distance to the south; camped at 5·30. The travelling has been slow owing to vexatious delays and the difficulties and obstacles met with, and has been extremely hard upon the camels. Travelled 14 miles. Saw a few fairly-sized gum trees and a few acacias; on the creek, magpies, eaglehawks, jays and crows seen. Rock specimens, Nos. 4 and 5, collected. Bar. 27·60in., ther. 98° at 3 p.m.

Sunday, March 31st.—Camp No. 9. Bar. 27·670 in., ther. 72°. —Started at 8·40; continued south for two miles when we struck a cattle pad with dray track on it; followed it up to the east for one and a half miles; it then turned N. 85° E. for two miles; here the track became so faint that we abandoned it and turned S. 25° E. for six miles when, striking a gum creek, I turned east for three miles, the creek splitting up into narrow channels. I turned S. 40° E. for two miles, here I struck a very decided cattle track upon which were a number of fresh tracks; followed this for four miles east; at 4·30 reached a clay-water channel with some very nice waterholes in it which were now quite full; around this spot mallee timber was observed for the first time upon this journey. The principal, and I may say the only, timber seen has been mulga and bloodwood, the exceptions being bean trees and dwarf pines and grevillia. Travelled 21 miles, which may be described as wide open valleys well grassed and with occasional clumps of mulga; hills and ranges upon both sides. Camped early, 4·30, but not soon enough for a heavy thunderstorm with rain broke overhead while we were unloading; it looked so threatening that I had everything put under the tarpaulins, the tent rigged, and everything made snug for the night. Two emus were seen to-day. Botanical specimens collected.

Monday, April 1st.—Camp No. 10. Bar. 27·720 in., ther. 72°. —Cloudy, close, and dull at daybreak, much rain, with thunder and vivid lightning during the night. A dog was heard barking this morning, which probably belongs to some blacks' camp; but to judge from the number of cattle and horse tracks seen last evening, I think we cannot be far from the station. Owing to there being but very poor feed for the camels they rambled away, and we did not get away from this camp till 9·30. Started on a bearing of S. 75° and had not been travelling many minutes before we saw two natives approaching; it appears they had heard the camel bells during the night: these were soon joined by several others, until we had quite a large escort to take us to the station, which we reached in three miles. The manager, Mr. MacDonald, was away, but the men showed us the best place to camp, which was a few hundred yards down the creek. The station is situated upon a small gum creek that runs into the Davenport creek. There is, thanks to last night's rain, plenty of surface water in the creek; when these fail, the station is dependent for water upon a native well soakage. Botanical specimens collected. The natives here at this time number about 40—men, women, and children.

Tuesday, April 2nd.—Glen Helen Station. Bar. 27·760 in., ther. 76°. —At 6 a.m., bright, fine, and clear. Started with Fred and Billy to make the ascent of Mount Razorback; it lays N. 4° W. from the station, distant about 4 miles. Leaving Fred at the foot with the camels to do some prospecting in the neighbourhood, while Billy and myself prepared for the ascent, we found it steep and in many places precipitous; composed largely of quartzite;

fragments of white quartz were loose upon the surface, and a few quartz crystals were found. After an hour of severe climbing, the summit was reached; the view was not so extensive as would be supposed; Razorback is certainly a misnomer, for there is a large area of flat country upon the summit. A high range, that I am told is Mount Zeil (of Giles), bears $235^{\circ} 30'$, distant about 4 miles; it is several hundred feet higher than Mount Razorback. Mount Sonder bears $111^{\circ} 30'$, distant about 8 or 9 miles. By aneroid measurement Mount Razorback is 1,831ft. above Glen Helen station. While I was recording these observations, Billy was hard at work building a small cairn to commemorate our visit. We then commenced the descent, which was almost as puzzling to me as the ascent. I was extremely glad to reach the bottom, and once more to walk upon level ground. Rock specimen No. 8 collected.

Wednesday, April 3rd.—Glen Helen Station. Bar. 27·700in., ther. 66° .—Cloudy and cold during the night: light east wind this morning. Preparing letter for the mail which leaves here on Saturday. Repairing camel saddles.

Thursday, April 4th.—Glen Helen. Started from the camp with Fred and Billy to make the ascent of Mount Sonder, travelled easterly down the creek for three miles, and than turned a little northerly towards the mountain. Directly we left the alluvial flats of the creek, we entered upon low stony hills covered with mulga scrub; as we neared the range, these became very dense, until we arrived at its base, where there was a large gum creek that appeared to take its rise at the western end of Mount Sonder, which is called the Redbank Creek. This certainly is a most beautiful and picturesque spot; the creek really is one of the sources of the Finke, and is fringed on both banks with large and splendidly-grown gums: it winds round the base of Mount Sonder, and flows southerly for four miles, when it joins the Davenport creek. Leaving Fred in charge of the camels, Billy and I made the ascent of the mountain; it was a moderately cool day, but it took us three hours climbing to reach its summit. Mount Sonder appears to have three separate peaks, the most easterly one looks to be almost inaccessible; upon the most southerly one of the three I built a small cairn of stones, and took the following bearings:—Mount Razorback bears $292^{\circ} 30'$, Mount Zeil 314° ; the most westerly high point of a range, which is locally called Haast's Bluff, bears $286^{\circ} 30'$. By aneroid measurement this point is 2,495ft. above Glen Helen station. The return journey was made in much better time, but we got a very severe shaking, so rough indeed that the jolting broke the minute hand of my watch; it was after dark before we reached Glen Helen station. Saw a couple of emus to day.

Friday, April 5th.—Bar. 27·715in., ther. 68° .—Was too much done up to-day to do anything but camp duties. Worked out

my observations of yesterday. Tested several mineral specimens that were collected, without any results. Got the photographic apparatus unpacked and ready.

Saturday, April 6th.—Glen Helen. Bar. 27·500in., ther. 74.—Steady rain set in at daylight. Went up to the station hoping to do some writing, but the rain drips through the thatched roof to such an extent that it is almost as bad as being outside. While at the Alice Springs I heard of the discovery of silver ores in this neighborhood, and was anxious to see them; but I never saw any one who had any specimens, nor could I find out who had made the discovery. When I was at Mount Sonder I saw where a little work had been done, but could find no trace in any specimens that I brought from there. Mr. MacDonald, the manager, gave me several specimens this morning, but not in any one of them could I find traces of anything but iron.

Sunday, April 7th.—Glen Helen. Bar. 27·810in., ther. 72°.—Took several photographs of natives—men, women, and children. Two women and one man were blind. Mr. MacDonald took Beetson for a ride to Mount Sonder. Fine day, high easterly wind. Mr. MacDonald sent letters away by a blackfellow, to meet the mail at the Mission Station.

Monday, April 8th.—Glen Helen. Bar. 27·820in., ther. 62°.—Not altogether satisfied with my short visit to Mount Sonder, I decided to visit the spot again, and to spend a few days there prospecting. Started soon after midday, and travelled down the Davenport creek for four or five miles, almost to its junction with the Redbank. Then striking a little northerly across some bald stony hills we reached the foot of Mount Sonder, where we camped amidst the most charming and romantic mountain scenery. As soon as the camels were unloaded, I went with Fred. to the mine or silver workings. I found they had followed the underlay of a reef of clay slate for 18ft., going through an ironstone crust on the surface, under which were various colored clays, all charged with iron. A gypsous earth seems also to have been met with. Some of the small ironstone knolls in this neighborhood have quite a purple appearance. Upon close inspection they are found to be a decomposed shale stained on the surface with iron. Others present quite a charred and blacked look, having all the appearance of manganese, for which I at first took it. In describing the rock formation of this part of the MacDonnell Range, I should say that the main ranges are composed of sandstone and quartzite. The lower hills at their foot, and towards the alluvial flats, through which the creeks flow, are composed of clay slates and shale with occasional hills of ironstone.

Tuesday, April 9th.—Camp No. 11. Bar. 27·975in., ther. 40°.—All of us out prospecting.

Wednesday, April 10th.—Camp No. 11. Bar. 28·975in., ther. 46°.—Prospecting all day, and observing for latitude till midnight,

which I made $23^{\circ} 35'$. Billy brought in some beautiful specimens of iridescent ores of iron; seen in the sunlight they are very brilliant.

Wednesday, April 10th.—Camp No. 10, Mount Sonder. S. latitude $23^{\circ} 35' 46''$ —Interviewing the most intelligent natives I ascertained the native names of the principal local geographical features to be:—Mount Sonder, Oorichipima; Mount Razorback, Ooratunda; Mount Giles, Um-bat-thera; Davenport Creek, Indianana; Haast's Bluff Range, Nyurla; Mount Zeil, Willatrika; Mount Crawford, Mareena; creek under Mount Sonder, Oorachilpilla. Oora means fire, and it is somewhat singular that Mounts Sonder and Razorback and the creek at the foot of Mount Sonder should all commence with this word.

Thursday, April 11th.—Camp No. 11. Bar. 27.910in., ther. 55° .—I went up the creek this morning with the camera, and took some photographs of this wild romantic spot. A walk of a little over a mile took us nearly to the head of the gorge. Beautifully clear water was running over the pebbly bed of the creek. As we approached the gorge the hills upon each side formed into perpendicular cliffs, and the creek channel became a chaotic mass of boulders, around and under which the water found its way. A little further, and the cliffs upon each side met, and all further progress was stopped by a large deep pool of water, with perpendicular cliffs, several hundred feet high, upon either side; there is a strange fissure in the wall, if I may so describe the mighty cleft in the range; it is the opposite side of the pool, and, of course, quite unapproachable, and it is down this cleft that the water comes from its unknown source, fills the pool, which, always overflowing, runs down the creek for a mile or more. There is a strange wild beauty about this place, which tempts one to remain and admire its lovely wonders. Several cranes were hovering about, and these had brought to the bank a fish from the water, and were discussing it when disturbed by our approach. It was much larger than any I have seen at these inland waters, and must have been nearly 2lbs. in weight. Returning to camp, I went with Mr. MacDonald six or seven miles in a south westerly direction to examine the country there, but found no indication whatever of mineral deposit.

Friday, April 12th.—Started away from this camp for Glen Helen. A gumtree branded T_{89} marks the spot where we camped. I kept further westward and under the main range. Left the stony hills and porcupine grass in about two and a half miles, and soon after crossing a gum creek had trial holes put down, intending to pan off the stuff from the bottom. Camped at Glen Helen.

Saturday, April 13th.—Bar. 27.600in., ther. 60° .—Beetson and Fred were sent down to the trial holes. Washed several dishes of dirt without any results. Bar. 27.650, ther. 90° at 3 p.m.

Sunday, April 14th.—Bar. 27.600in., ther. 70° at 6 a.m.—Sultry,

with high warm east wind, changing to north from midday. Bar. 27·525 in., ther. 86° at 3 p.m.

Monday, April 15th.—Camp No. 10, Glen Helen Station. Bar. 27·600 in., ther. 66°.—Cloudy with light north wind, heavy showers of rain fell during the night and kept up till sunrise. I hoped to have made a start to day but the uncertain weather and everything being thoroughly wet, I decided to postpone it till to-morrow. I should have much liked to stay a fortnight prospecting in this neighborhood, but I have received so little encouragement that, perhaps, the interests of the Association are best served by moving on; at any rate, it is with these views that I decide to do so. Bar. 27·500 in., ther. 80° at 3 p.m.

Tuesday, April 16th.—Camp No. 12. Bar. 27·580 in., ther. 56° at dawn.—Very heavy dew during the night, but a most lovely morning. Our arrangements all completed, we packed up and started. Mr. MacDonald kindly gave me all the fat of a bullock that he killed last night. Many and various have been the attentions that we have received from this kind-hearted gentleman during our stay near his homestead, among others was a liberal supply of fresh milk sent down to our camp every morning, besides which, upon hearing that my watch was broken, he very generously lent me his for the journey. It will be understood that a timekeeper is a most important item in the outfit of such a party; observation for position would be almost impossible without one. Started away upon a bearing of S. 82° W., following the tracks of some cattle that Mr. MacDonald was sending out to the Arumbara Creek; kept upon this bearing for twelve miles and then turned N. 60° W. for six miles when we arrived at the cattle yards and camped with Mr. MacDonald and the men. Travelled eighteen miles, principally through mulga scrub. Bar. 27·625 in., ther. 78° at 3 p.m.

Wednesday, April 17th.—Camp No. 13. Bar. 27·745 in., ther. 46°.—Mr. MacDonald decided to travel with us for the first day, and he had with him a native boy who knew of a pass that would take us through the wall-like range that lay to the southward, and which looked as formidable as that which we followed for so many days to the northward. Started away at 10 a.m. on a bearing of N. 75° W. for four miles, this took us down the Arumbara Creek, which at this point took a turn to the northward towards the range that is called Haast's Bluff. the outline of this range is most striking, being a series of irregular peaks; the native name for it is Nyurla, it is of the most singular form. I cannot see how it can be identical with the Haast's Bluff of Giles, for there is certainly nothing of that kind to be seen. I then turned upon a bearing of S. 75° W. for three miles, this took us over low stony hills covered with spinifex, and to take advantage of a favorable spot to get through a line of hills that lay upon our course I turned south for ten miles: we were again face to face with a wall-like range. I

decided to waste no time in searching for a pass so turned S. 70° W., we were now in a stony valley with a bold bluff range of over 1,000 feet immediately south of us. Mr. MacDonald's black-boy was now further in this direction than he had ever been before, and did not like the idea of going any further. From him I learn that this bluff is called by them Mareena, at its N.E. end is a spring called Enditta, but as this is in an inaccessible spot I did not waste time in visiting it. Camped at the foot of the bluff, travelled six miles upon the last bearing. Travelled fifteen miles rough, stony, hilly ground, covered with spinifex the whole way, with trees of bloodwood, mulga, and gum; magpies and crows seen this morning. Bar. 27.510in., ther. 82° at 3 p.m.

Thursday, April 18th.—Camp No. 14, Mareena Creek. Bar. 27.560in., ther. 65° at sunrise.—I omitted to mention that a small rock hole, containing a little water, was found near this camp. Mr. MacDonald, with some difficulty, managed to get his horses up to it. Mareena Bluff is quite inaccessible from this side, but I should think a splendid view would be obtained from the top. While the camels were being brought up I ascended a lower line of hills that lay to the northward, from here I observed Mount Sonder N. 87° E., distant about 35 miles, Mount Razorback N. 76° E., Mount Zeil is hidden behind some hills close by. The rock formation of these hills is sandstone and quartzite. Collected rock specimens 21 and 22, started at 9, continued up the valley upon a bearing of S. 70° W. for five miles. Seeing a small water channel between my position and the bluff, I went to examine it and soon found that water would flow to the southward, so that we were now on the southern slope of the MacDonnell Ranges, and I hoped that nothing new would impede my progress to the westward. Turned S. 17° W. for two miles to avoid some rough hills, and then followed down the Gum Creek south for about 3 miles and camped. My position now, if I am right, is on the Missionary Plain, and this is Rudall's Creek of Giles. The last three miles has been over very well grassed country, open with occasional clumps of mulga and colalya gums. Several red kangaroos were observed, but Billy was not successful with his rifle. This has been a very short stage, but the stones had crippled two of the best camels, so I camped early for their benefit. Mr. MacDonald returned to Glen Helen at midday. Bar. 27.570in., ther. 85° at 3 p.m.

Friday, April 19th.—Camp No. 15, S. lat. $23^{\circ} 41' 25''$. Bar. 27.600in., ther. 42° at sunrise.—By observation I found the latitude of this camp to be $23^{\circ} 41' 58''$. Started upon a bearing of S. 82° W. at 8.40, travelled over well grassed mulga flats till 11, when we entered into porcupine sandhills rising towards low dark scrubby hills, which I take to be the Gardiner Range of Giles; these lay across our course and were met with at 1 p.m. The sandhill and porcupine then gave way to mulga scrub, which, not being specially dense, was a pleasant relief from the spinifex sandhills; this only

continued for five miles when we were again in sandhills with spinifex, two little hills with pines on them being right on our course. Camped at 5 p.m. in oak sandhills and spinifex, there was not anything for the camels to eat, so at 7 p.m. they were tied up for the night. Travelled twenty miles. A few kurrajong and ironwood trees met with, no animals or birds seen. Bar. 27·675in., ther. 34° at 3 p.m.

Saturday, April 20th.—Camp No. 16. Bar. 27·680in., ther. 41° at sunrise.—Latitude 23° 43' 43". The camels were let loose a little before dawn, and they made such use of their time in travelling that they have made it a lesson for me to keep a closer watch on them in the future. Started at 9, continued on yesterday's bearing for five miles when we reached the little hill seen yesterday. I found it to be an isolated knoll of sandstone about 300ft. above the level of the surrounding country, and hemmed in upon all sides by spinifex sand hills; not a blade of grass anywhere. I left the camels to make their way round its eastern base while Billy and I made the ascent; its irregular surface is covered with dwarf pines, and among the interstices of the rocks numerous rock wallabies were seen. The view to the west and south-west was one apparently of spinifex sandhills; to the N. and N.W. the southern slopes of MacDonnell Range extended for many miles. The country seemed so dry that I deemed it advisable to give the camels a drink before starting for Glen Edith, and with that view I turned N. 5° E. towards the main range where I did not anticipate any difficulty in obtaining a sufficiency for one night. For five miles we continued upon this bearing when we crossed a gum creek which had a westerly course; two miles from here it became so stony that I sent Billy on ahead to look at the gorge that I had been steering for, not thinking favorably of it from this spot. I now turned S. 45° E. to get away from the stony slopes of the range into the valley, through which I thought the gum creek would flow; this we reached in four miles much to the relief of ourselves and the camels, for the stony ground and the very dense mulga scrub of the last few miles were tedious and tiring to the last degree, there was very good feed for the camels but no water. I think this must be Carmichael's Creek of Giles, if so, the sandstone hill seen this morning would be Mount Solitary. Just before dusk Billy returned with the intelligence that a large rock hole in the gorge that he visited had just gone dry. The trees met with to-day were mulga, mallee, banksias, and various leguminosæ and an occasional kurrajong tree. Bar. 27·700in., ther. 88° at 3 p.m. Camped at 5·30.

Sunday, April 21st.—Camp No. 17, Carmichael's Creek. Bar. 27·750in., ther. 51°.—A keen easterly wind blowing, but mild during the night; heard a few crows this morning, I trust it may be a sign of water being near, for I do not like the idea of doing any more easting. The camels were let go a little before dawn and

spent the time more to their own advantage than yesterday. Started at 8.35 on a general bearing of N. 66° E., but in these dense scrubs and the continued turnings off to examine different gorges for water it is impossible to follow an exact course, but I may explain that I am following the slopes of the MacDonnell Range easterly to find the gorge where this creek rises; examined many places during the day, in some water was found high up in ledges of rocks quite unapproachable for camels, but which are of course available for natives and birds; continued upon this bearing for five miles and then turned east for three miles; from this point I turned N. 10° W. for two miles to examine a favorable looking spot, but without success. I now turned S. 60° E. for three miles to get the camels off the stones; the mulga scrubs upon this course were very dense, and caused incessant delays, and hoping to free myself from them, I turned S. 70° E. for one and a half miles and again emerged upon the alluvial flats through which the creek flows. Here we found abundance of feed for the camels near the gum creek, upon which we camped. These mulga flats are intersected by small gum creeks, and are park-like and very attractive to the eye, and in a rainy season, with water everywhere, and abundance of rich green herbage, which is withered and black to-day, I can imagine a traveller dwelling with pleasure upon such a charming spot, and almost pardon any vagaries of his pen in describing its richness and beauty, which are, however, of a very transient character. Bar. 27.580 in., ther. 72° at 5 p.m.

Monday, April 22nd.—Camp No. 18. Bar. 27.575 in., ther. at dawn 39°.—The valley between the MacDonnell Range and what I take to be the Gardiner Range at this point cannot exceed nine or ten miles, and a few miles further west it is still less. Started up the creek at 8.15, N. 20° E., and very soon left our last night's beautiful surroundings, and plunged into a region of mulga scrub and stones towards the foot of the main range again. This continued for two miles, thence N. 25° W. two miles up a stony watercourse with scrub, stones, and spinifex everywhere, N. 40° W. to a gorge which was a disappointment. From here turned S. 20° W. one mile to a gum creek which seemed to emerge from the range at a promising place. Turned N. 10° E. to enter the glen. We had no sooner done so than two emus were observed stalking down the glen, this looked hopeful, for if water was accessible to them it would be to us. Billy went on ahead on foot and soon called out "Water! all right!" It was 11 a.m. when we struck the water, and the seventh day since the camels had any, and they drank greedily. This water does not lay any claim to permanence, in fact it is only a tiny pool from last December rains, the ground is very stony and the hills on either side are covered with spinifex. A few bean trees and gums are the only timber, the only attraction the place has is the little pool of beautiful water. Variation of compass, 2° 27' E. Bar. 27.260 in., ther. 84° at 3 p.m.

Tuesday, April 23rd.—Camp No. 18, Glen Farewell. Bar. 27·290in., ther. 52°; S. latitude 23° 37' 24".—Bright fine morning. The camels were not brought up till nearly mid-day. I suppose they wandered away to be off the stones, let them have the rest of the day to themselves. Went up the gorge to see if any more waters existed, was away some hours and returned to camp not having seen a drop, except where the camp is. The rock formation of this part of the MacDonnell Range is quartzite and sandstone. Collected rock specimens, 26, 28, 29. Botanical specimens were collected. With the hope that this will be the last appeal that I shall make to the MacDonnell Range, I call this Glen Farewell. In all probability it will not be visited again, but should any future traveller pass by it will be recognised as being a wide glen of easy access, about two miles from its entrance to its head; about half way is a gum tree marked s_9^T on the N. side which is near the waterhole. I had the casks filled up with this most beautiful water and have all in readiness for the next water, whenever it may happen to be. Weather fine. Bar. 27·310in., ther. 98° at 3 p.m.

Wednesday, April 24th.—Camp No. 19. Bar. 27·400in., ther. 51°.—Fine, still, clear, no dew. Watered the camels at mid-day, and because they were wanted to drink, very few would do so. Started at 2·25 intending only to be clear of the stones and scrub so as to have a clear course for Glen Edith to-morrow. Upon leaving the glen the creek splits into two small chanel; taking the most westerly, I started upon a bearing of S. 20° E. for five miles: at this point the creek has forced its way between two low hills that would not be readily seen above the surrounding scrubs of mulga, from here I took up a bearing of S. 55° W. for two miles, when being clear of stones and scrub I camped. To the eastward of Glen Farewell there seems to be a wide gap in the MacDonnell Range, or it may be that the range turns to the northwards. On the east side of this apparent gap are three or four bluffs or escarpments, of which Mareena Bluff is the most easterly. Bar. 27·755in., ther. 88° at 5·30.

Thursday, April 25th.—Camp No. 20. Bar. 27·775in., ther. 44° at 6 a.m.—Started at 8·20 on a bearing of S. 80° W., to keep midway between the MacDonnell and Gardiner Ranges, in one mile struck a small gum creek flowing south, in four miles a much larger one with a sandy bed and a well defined channel flowing westerly—this must be Carmichael's Creek; there is no doubt the source of this creek is in the Gardiner Range, and those following southerly from the MacDonnell Range flow into it. I should have liked to follow this creek to its source, for I think good water will be found there. In seven miles from our camp we were face to face with spinifex and oak sandhills, so leaving the valley of Carmichael's Creek I took up a bearing of S. 67° W. for Glen Edith, and in seven miles reached the foot of Mt. Solitary.

Collected rock specimen No. 31. Travelled over spinifex and oak sandhills with broad valleys, in which were clumps of mulga and kangaroo grass. Camped at 5 p.m., having found a fairly good feeding patch for the camels. Travelled twenty-one miles. Bar. 27·875in., ther. 75° at 5 p.m.

Friday, April 26th.—Camp No. 21; S. latitude 23° 47' 17". Bar. 27·900in., ther. 61° at dawn.—Cloudy all night. A considerable amount of moisture in the atmosphere this morning. Started at 9 a.m. on the same bearing as yesterday, S. 67° W. for six miles, continued in undulating oak and spinifex country, the sandhills then became closer and mallee and mulga took the place of the oak timber. At this point a peaked hill, which I take to be Mount Peculiar, bears N. 8° E. distant about thirty-five miles. Turned S. 80° W. to avoid a sandstone ridge, kept on this bearing for three miles and then turned on a bearing of S. 48° E., continued along the foot of sandstone ridge for three miles, and then turned N. 10° E. for one mile and camped on spinifex sandhills with oaks. I think I am now in the neighborhood of Glen Edith, for Mr. Gosse in his diary mentions a sandstone cliff such as I met with before turning on the last bearing. Bar. 27·750in., ther. 78° at 6 p.m. No birds or animals seen to-day.

Saturday, April 27th.—Camp No. 21; S. latitude 23° 48' 25". Bar. 27·825in., ther. 62°.—I was awakened at dawn by the sound of heavy thunder to the westward. Called all hands to get saddles and boxes together for the rain was commencing; had everything snug and breakfast over when the rain set in so steadily that I decided to remain for the day and had the tent put up; it rained steadily until midday. Fred Warman and Billy started off on foot to look for Glen Edith and later in the day I went out on a camel to try and find it; noticed a number of native tracks going south-westerly, and shall follow them up to-morrow. Unfortunately, I have not got Mr. Giles' journal, otherwise I should find it easily enough, for I feel sure I am not a great distance away from it. Noticed a few swamp hawks hovering over the camp, but which flew off to the eastward.

Sunday, April 28th.—Camp No. 22. Bar. 27·725in., ther. 62° at dawn—Slight east wind, clear and fine. Started at 9 a.m. on a bearing of S. 40° E. to intersect the black's tracks seen yesterday. After travelling one mile turned upon the tracks S. 15° W.; at two miles sandstone hills, about which we rambled in endeavoring to find the tracks, turned east as Billy had evidently lost the tracks among the stones; in three miles reached the sandstone cliff spoken of by Mr. Gosse in his diary, but I imagine this must be quite its eastern extremity. A few specimens of a species of mulga that is rarely met with were growing here, their straight, elegant, and slender tapering stems twenty feet high, with light horizontal-laying limbs, like a Norfolk Island pine, presenting a very beautiful appearance; the singular oak and spinifex undulations here set in

and continued for five miles. The rest of the day was spent in working a passage through dense mulga scrub and porcupine sand-hills, trending N. and S. Camped at 5 p.m., having travelled twenty-one miles. At this point the Gardiner Range is distant six miles to the N.W., and it is quite evident that I have missed Glen Edith and the probabilities are that we were close to it the night we were overtaken by the rain. Bar. 27·575in., ther. 74° at 5 p.m. No birds or animals seen to-day.

Monday, April 29th.—Camp No. 23, Glen Edith. Bar. 27·580in., ther. 62° at dawn.—Started at 8, returning upon my tracks to the point where the unusual mulga trees were seen, which is the eastern extremity of the cliff spoken of by Mr. Gosse; kept along the foot of this for six miles when Billy left us to reconnoitre, he soon came back from the southwards telling us that he had found it, but that there was not much water. Turning down a small watercourse that ran to the southwards among low sandstone hills we arrived at Glen Edith, but not until Billy had taken me right up to the “Tarn” could I see any spot likely to hold water. Everything here is in miniature—the hills, the creek, the Glen, and I am sorry to say the water; at present it is eighteen inches deep, five yards wide, and twenty yards long; and by the time twelve camels have had one drink, not much will remain. The weather is moderately cool and after the first drink they may not come for more for a day or two, but it is evident more will soon be required. The camels were unloaded at a spot where traces of an old fireplace were observed, and where were several marked trees. It took a long time to water the camels only two being able to water at one time, the waterhole or tarn being pinched up between two large masses of rock, leaving only one end available for watering at. Round about this very pretty little spot are a number of white gum trees, the largest may be three feet in diameter, while on the rocks are dwarf pines. I looked about for a long time before I could find a tree that would be likely to be marked by Mr. Gosse, for I knew that he used rather large characters, but Fred found one which showed a long narrow strip of exposed and blackened wood, by very carefully chipping upon the new bark, which showed a faint line where the bark had been taken off when the tree was first marked, and by exercising the greatest care the overgrowth of wood and bark was removed upon each side leaving the tree branded and fully exposed as upon the day it was done. The tree marked by Mr. Giles, *Glen Edith*, with date, was so grown over and rotted away that the overgrowth came away in small fragments; the tree branded CARMICHAEL showed the whole name with the exception of the two first and last letters. Mr. Chewings’ tree marked in 1886 was, of course, quite complete, no overgrowth worth mentioning having taken place. A small tree marked by Mr. Gosse with a broad arrow was so overgrown that only the shaft of the arrow remained. Of any seeds of plants that

may have been sown by former travellers in this fertile spot no traces are to be found now, nor in the many places that I have visited after former travellers have I ever found any traces or evidence of the seeds having germinated. I can only reiterate my regret that I had no seeds of trees or dates to experiment with here. Camped at 2.20 p.m. Since noon the weather has been sultry and oppressive with every indication of a change. Bar. 27.680in., ther. 89° at 3 p.m. An observation made this evening gives me S. lat. 23° 49' 36".

Tuesday, April 30th.—Camp No. 23, Glen Edith. Bar. 27.700in., ther. 66°.—Cloudy with light easterly wind. Writing up journal, plotting, and engaged in many camp duties; took some photographs in the afternoon. Many of the camels have very bad backs, and others have to be attended to.

Wednesday, May 1st.—Bar. 27.660in., ther. 66°.—The sun came out in good force at noon, placing the mercury up to 90° in the shade. The camels drank a great deal, and seriously reduced the water supply. Took several views with the camera.

Thursday, May 2nd.—Bar. 27.660in., ther. 74°.—Light N.E. wind. The night was close and oppressive, and rain seemed inevitable, but the morning broke clear and warm; thermometer in the dense shade of a pine-tree went up to 94°. I shall leave the main camp here and start away to-morrow with Billy and three fast camels to make a flying trip to the S.W. with the hope of finding another place to bring the party to. I expect to be away eight or nine days, and in that time I hope that the camels which have sore backs may be improved.

Friday, May 3rd.—Bar. 27.600in., ther. 64°.—A light shower at 11 o'clock last night called us all out to cover up. It lasted only a few minutes, and the morning broke bright, clear, and cloudless, with a N.E. wind. Started with Billy and three fast camels at 8.30, taking ten days' provisions. Travelled over oak and spinifex sandhills, and at 5 p.m. reached the foot of Sandstone Range, that is easily seen from Glen Edith; course, S. 68° W., distance twenty miles. The sandhills passed to-day ran nearly east and west until we approached these hills, they then became irregular and much higher, and continued right up to the foot of the range, which present an abrupt escarpment towards the north. All the afternoon heavy clouds had been accumulating, and at sundown it was gloomy and threatening, so much so that I put up my small tent that I fortunately brought with me. I was preparing for bed when a few drops fell, and the night was as dark as pitch. For an hour after this it was most oppressively close and still, steady rain then set in. About midnight I sent Billy (the black-tracker), who was my only companion, to bring in the saddles. Returning in the darkness he stumbled against the tent prop, and down it came. Billy was very prompt in replacing the prop, but I was in an unenviable position for a little while. The small tent,

meant only for one, had now to cover Billy, myself, and the three camel saddles. I woke at intervals to hear the rain pouring steadily down.

Saturday, May 4th.—Bar. 27·625in., ther. 61°.—At daybreak I was up, but not out, for it was pouring hard. Owing to the mishap of last night the tent was leaking in several places. Billy started a fire, and during a temporary lull we managed to get our breakfast, but we were prisoners in the tent the whole day, owing to the incessant rain.

Sunday, May 5th.—Bar. 27·660in., ther. 64°.—I deem myself the most fortunate of travellers to have heard the sounds of running water in such a country as this. At daylight this morning water could be heard running from the hills and gorges, discharging streams of beautiful clear water into the thirsty sands. The only reading that I have is Mr. Gosse's diary, and if it rains much longer I shall know it off by heart. Steady rain fell uninterruptedly the whole day; the camp could not have been pitched in a better place for such an occasion; upon the lee side of a high sandhill, abundance of firewood ten yards in front, and running water in every direction.

Monday, May 6th.—Bar. 27·600in., ther. 57°.—Raining all last night, and a close prisoner in the tent all this day from the same cause; the rain was driven before a gale of wind from the N.E. last night, which made it intensely cold; fire beaten out by rain.

Tuesday, May 7th.—Bar. 27·600in., ther. 64°.—The rain could not have been so heavy and incessant last night, for at dawn this morning, though it was still raining, there were a few live embers in the fire heap; these were soon worked into a brisk fire. The rain ceased at 7 a. m., but then came a fog or mist, so dense that nothing could be seen till 10. At noon I went out with the camels for a short journey round the foot of the hills, half a mile from the camp; came to a strong stream of water in a mulga channel; followed it down one and a half miles, when it was quite lost in the sandhills. I thought it strange, that after all this rain, the ground was nowhere in the least soft, showing, I imagine, that there must be a considerable depth of sand. Keeping along the foot of the range in a N.W. direction I ascended a hill, hoping to get a view to the south-west; but higher hills lay in that direction, which time would not allow me to visit; returned to camp by a slightly different road at 6 p.m.

Wednesday, May 8th.—Bar. 27·622in., ther. 59°.—Started away from the camp, where I have so unexpectedly been kept a prisoner for four days and five nights by incessant rain; took up a bearing of N. 76° E. I am not very sure that this bearing was adhered to, for Billy mounted upon a very fast camel went ahead, and as both knew exactly where they were going, I was more than employed in keeping up to them. Arrived at Glen Edith at 2·30. Up till eleven o'clock we had been travelling in a dense fog, but

this cleared up, and the rest of the day was bright and fine. I found upon my arrival that the waterhole has been quite filled, though strange to say the creek had not run: all our belongings were out on the rocks drying. No damage worth mentioning had been caused by the wet, although the canvas tarpaulin had been found to be next to useless; so my companions sought shelter under the large overhanging rock at the back of the waterhole, under which they were perfectly dry during the whole of the rain.

Thursday, May 9th.—Bar. 27·650in., ther. 58°.—A very bright clear morning; making preparations to start away to-morrow; took observations for latitude, variation, and time.

Friday, May 10th.—Camp No. 24, Bar. 27·550in., ther. 66°.—Light showers until 10 a.m.; weighed up and arranged packs: camels did not turn up till late; started at 12·30 on a bearing S. 84° W. Travelled over spinifex and oak sandhills till 5·30; during the afternoon there was very heavy thunder with most vivid lightning, and the sunset was very grand; the setting sun tinged the huge thunder clouds with many shades of bronze and gold; upper currents of air twisted these enormous volumes of cloud into many fantastic and swiftly-changing forms and varying tints. We were sitting down to our evening meal when the rain came down in torrents, the supper was abandoned and all the tinware in a few minutes was full of water; it lasted only half an hour but everything was soaked; the ground and our blankets were soaked, and the fire beaten out. Travelled fifteen miles through desert oak, mallee, and mulga.

Saturday, May 11th.—Camp No. 25. Bar. 27·780in., ther. 66°.—A heavy rain squall turned me out at 2·30 this morning; dawn broke at last threatening and gloomy; the camels rambled away, and when brought up, three of them were found to be suffering from the effects of some poisonous plant, the symptoms being a trembling of the limbs, frothing at the mouth, falling down, and inability to chew the cud; the usual remedies were applied, in two cases effectually, so we saddled at 10; it soon became evident that the third one would cause serious delay, so left it behind with a man to bring it along as it was able. Travelled upon the same bearing as yesterday, viz., S. 84° W. for two miles, when I decided to turn towards the hills, where I had been overtaken by the rain; here I knew there would be water, and hoped that a days rest would recruit the camels. Turned S. 35° W. towards a creek that was running when I was there last week; reached this in five miles; camped at 1 p.m. The sick camel arrived later in the afternoon; put everything out to dry. It has been quite a summer's day, the ther. 89° in the shade. Fred went down to look at the camels at dark, he found them still trembling and quite unable to stand. I think the best remedy is to keep them moving. These hills have been named Watson's Range. Bar. 27·631 in., ther. 84° at 3 p.m.

Sunday, May 12th.—Camp No. 26. Bar. 27·775 in., ther. 59°. —I was turned out by a smart shower at 3 o'clock this morning, but it cleared away in an hour; camels were not brought up till 9, the poisoned ones still looking very bad, having eaten nothing during the night. Saddled them all up and started at 10·30 N. 45° W. for three and a half miles, then turned S. 60° W. one mile up the creek, then turned south still following up the running water for two miles; this brought us to the top of the range. I now turned S. 64° W., and in five miles reached the southern slope of the range. I now directed my course towards a singular looking hill seen from the top of the Watson Range, and after travelling for eight miles upon this bearing S. 83° W., I camped for the night. The last three miles of the day's travelling being over well-grassed open country with occasional clumps of mulga. Secured specimens of the poison plant. Bar. 27·800 in., ther. 70° at 5 p.m.

Monday, May 13th.—Camp No. 27. Bar. 28·100 in., ther. 44°, cold south-east wind.—Started at 8·40. This camp is situated at the south-eastern end of a line of hills running towards the N.W., and presenting a line of cliffs to the southward. To examine a remarkable part of this range I turned upon a bearing of N. 37° W., travelled over open spinifex sandhills for ten miles, then turned northerly for half a mile when we came to a gum creek running south-westerly; I was in hopes of obtaining sufficient to fill my kegs, but was very agreeably surprised to find a stream of beautifully clear water coming from a glen in the hills. I have never seen such magnificent bean trees as those growing on the banks of this creek, besides gum trees of majestic proportions luxuriating in the richest brown loam imaginable. There were grasses, shrubs, and undergrowth of the most vigorous growth, low pine clad sandstone hills on either side, completing a landscape only too seldom met with in Central Australia. We had travelled but a short distance it is true, but it was impossible to pass this spot without examining it in detail, besides my ailing camels would benefit by a day on such magnificent feed; so at the entrance to the glen we turned them out. Travelled thirteen miles. Collected rock specimens Nos. 38, 39, and 40. Bar. 28·00 in., ther. 68° at 5 p.m. Heard some curlews in the evening.

Tuesday, May 14th.—Camp No. 27, Gill's Creek; S. latitude 23° 49' 25" E. long. 130° 33'. Bar. 28·010, ther. 50°, S.E. wind.—Last night was too cloudy and overcast for observing; the poisoned camel is no better, the animal cannot raise any cud, though repeatedly and continually trying to do so, and eats but very sparingly; all the other functions appear to act well, quantities of green frothy saliva occasionally escape from the nose and mouth; this is especially noticeable when the head is held down either to drink or in the act of laying down. I shall let it rest here for two days, I can then do no more. Went up the glen with Billy to

explore its beauties and wonders, walked for three miles up the creek, for the last two miles we had walls of sandstone rock about 80 or 100 feet high on either side, the creek channel being about a chain wide, running water the whole way. The creek in many places formed into pools or rock ponds; these were two and three chains in length and ten and twelve feet deep, and so shaded by rocks on every side that they cannot be looked upon as otherwise than permanent for caravan purposes. I have called this "Gill's Creek," after Mr. Thos. Gill, of Glen Osmond, and hon. treasurer to the S.A. branch of the Royal Geographical Society, and the range from whence it takes its rise, the "Cleland Hills," after Dr. W. L. Cleland, of Parkside. Making our way up the cliff we found ourselves upon sandstone hills, and soon found another ravine down which water was running into the main channel. Returned to the camp well satisfied with my day's ramble.

Wednesday, May 15th.—Bar. 28·010in., ther. 39°, S.E. wind, cold, and heavy dew.—By observation I find this place to be in lat. 23° 49' 25", E. long. 130° 37'. Went up the east branch of the creek; found running water for over two miles, with perpendicular walls upon either side. The channel is obstructed with enormous boulders of rock, and does not form into deep pools like the one we travelled up yesterday. Altogether there is nearly twelve miles of running water in the different channels that empty themselves into Gill's Creek. The glen at the head of this creek I have named "Glen Emily," after my sister. I do not think this water is always running, but it will continue to do so for some months to come. Billy went down the creek with his rifle, and returned with a fine kangaroo. This materially relieves our stock of meat, which is not so well supplied as I should like it to be. I took several landscape views of this interesting spot, and at the entrance to the glen marked a gum tree ^T₅₈₉. Rock specimens Nos. 41 to 47 collected.

Thursday, May 16th.—Camp No. 28. Bar. 28·055in., ther. 45°.—I would have much liked to stay another day or two amidst such beautiful surroundings, but, as the camels had recruited and were on the way to recovery. I decided to journey on to the westward. During my stay here I had prospected in the creek channel for minerals and put down several trial holes, but without success. The rock formation is sandstone and quartzite, and, though most diligent search was made, no trace of mineral-bearing stone was discovered. Any future traveller that may approach this spot will, if far enough to the south, observe a line of cliffs facing the southward; at their westerly end one more prominent than the rest stands further to the south; at the foot of this will be found Gill's Creek. Started away at 9·45, steering S. 40° W. for about one and a half miles to clear the hills, then taking up a due west course we were soon in spinifex sandhills. The Cleland Hills could be seen stretching away in a W.N.W. direction. Between us and

them I could see what appeared to be a grass valley running parallel with the hills. The little isolated hill that I saw from Watson's Range is three or four miles S. 40° W. of Gill's Creek, and from this point is very plainly visible. At five miles we reached a sandstone ridge running north and south, and an extensive view of the country to the W. round to W.S.W. was obtained, and appeared most unpromising—apparently nothing but a sandy waste, by no means where good quarters or easy times might be expected. Travelled over oak and spinifex sandhills till 5.30, and then camped, surrounded by poison-bush on all sides. Watched the camels the whole time they were loose, and tied them up for the night. Travelled twenty miles. Bar. 28.290in., ther. 78° at 5 p.m.

Friday, May 17th.—Camp No. 29. Bar. 28.310in., ther. 41° . Calm, fine, heavy dew.—Started at 8.40 N. 36° W., glad to get away from this poison-infected spot. At five miles the Cleland Hills were still to be seen to the northward: at six miles a low sandstone formation was seen to the southward; at ten miles the sandhills were not quite so formidable. We here entered a flat piece of country, about two miles across; a few claypans and good grass. A surface covered with gypsoous earth and spinifex then set in, which made the travelling very heavy. Having crossed this we were again in spinifex sandhills. For three or four miles these had been swept by fire, and were perfectly bare. I camped in these burnt sandhills, being so far fortunate to find a small patch with feed on it that had escaped the fire; but the area was so small that the camels were brought up at 8 p.m., and tied up for the night. Travelled twenty-four miles. No animals or birds were seen to-day.

Saturday, May 18th.—Camp No. 30. Bar. 28.125in., ther. 60° .—From a high sandhill near this camp took circumferenter readings to a low bluff at the west extremity of the Cleland Hills, 57° . A range running in a N.W. direction, with isolated hills at their S.E. extremity, bears 8° , distant about twenty-five miles. In the centre of this range is a high point, at least 1,000ft., which I have named "Mount Lyell Brown." after the Government Geologist, and the range I have called after Mr. A. T. Magarey, the hon. secretary to the South Australian branch of the Royal Geographical Society. A high range, distant about forty miles, I have named "Mount Rennie," after Professor Rennie, of the Adelaide University, bears 320° . Started at 8.15 on a bearing of N. 83° W. At nine miles we came upon a limestone formation, upon which there was a little saltbush. The hungry camels snatched greedily at these choice morsels as they passed along. Had there been any extent of it I should have turned them out, but we were soon in dense mulga and spinifex again. It will be seen that the camels have been tied up every night since we left Gill's Creek. Whatever their capabilities may be of going without water, it is quite certain they cannot do without food, and I hope

to find something for them to-morrow. Camped at 4:40, upon what looked to be a good place for them; there was but very little for them after all, and at dusk they were again brought up for the night. Bar. 28·200in., ther. 76° at 5 p.m. Neither birds nor animals seen to-day. Travelled twenty-six miles.

Sunday, May 19th.—Camp No. 31; S. latitude 23° 52' 36". Bar. 28·180in., ther. 64°. Cloudy, dull, close.—The appearance of the camels this morning was pitiable, and it was evident that food must be got for them to-day. Mount Rennie, bearing N. 4° W., distant about fifteen miles, looked too abrupt to expect to find water at. Hills to the N.N.W. looked doubtful. Upon a bearing of S. 28° E. a cluster of bare red rocks were observed, and to these I directed the caravan, as being the most certain place of finding what I require. These appeared some eight or nine miles away. One of them presented a good slope of bare red rock, and after the late heavy rains I made sure that I should get feed and water for the suffering animals. After travelling over mulga flats, with grass and spinifex and dwarf mallee for nine miles, we arrived there, spinifex and oaks growing right up to them. They appear to be being fast covered up with sand; but no water was to be seen. Billy seemed to think there was some; so, giving him a camel, he started off to search, while I went on the rock to take some bearings. Billy soon returned, telling us that he had found a native well. Upon going to see it I found a small hole about 3ft. deep, with spinifex growing all round it. There was not the slightest clue to guide anyone to it; but the native's unerring instinct or wonderful keen sight directed him straight to it. It was evident a quantity of work would have to be done before any camels could be watered at it; but we set to work and opened it out, boxed it up with wood and stones, and by nightfall three of the worst looking camels had been watered. From the tops of these rocks I took particular notice of a noble-looking bluff, that must be over sixty miles distant. It bears N. 54° W. It has a most inviting appearance, and I hope to find in its neighborhood a change from the monotonous sandhill country that I have been in since leaving the MacDonnell Ranges. Bar. 28·200in., ther. 86° at 5 p.m.

Monday, May 20th.—Camp 31, native well at Sandstone Rocks; S, latitude 23°, 52'. 36". Bar. 28 320in., ther. 56°.—Cold south-east wind. The well filled up to sixteen buckets during the night; these were baled out into the tarpaulin, and more slowly drained in. From the top of the rocks near the camp I observed a long high range bearing S. 19° W., distant about sixty miles. Mount Rennie bears N. 10° W.; it is a flat-topped hill, about 1,000ft. above the plain, and has a low isolated hill quite close to its N.W. extremity, while a series of low ridges lay to the eastward of it. The little well made sufficient water to satisfy all the camels by taking them up three at a time; the sandhills hereabouts are covered with

shrubs and herbage, such as they like, but there is not a blade of grass anywhere around. Black's fires were observed to the southward; these were so close that I thought they would have called upon us, but they kept away. Bar. 28·300in., ther. 65° at 5 p.m.

Tuesday, May 21st.—Camp No. 32. Bar. 28·300in., ther. 50°.—Light south-east wind. The camels rambled away during the night, and we did not leave here till 11·15. Travelled upon our tracks to Camp No. 30, and then started upon a bearing of N. 28° W. towards some low hills, where I hoped to form a depôt; the country travelled over was of a firm sandy nature, with sandhills running N. and S., about a quarter of a mile apart, all thickly clothed with spinifex, occasional oaks, and a few white gum trees were met with, but for the most part it was destitute of timber. The tall bleached stalks of the spinifex waving in the wind, the unbroken silence, and absence of animal life, all contribute to make up a wild weird picture of desolation. Travelled fifteen miles. Bar. 28·500in., ther. 66° at 5 p.m.

Wednesday, May 22nd.—Camp No. 33. Bar. 28·525in., ther. 38°.—Started at 10 past 8 upon a bearing of N. 25° W. From this camp Mount Rennie bears N. 13° E., distant about six miles; it has a bare appearance, without any gullies or ravines down which water would fall or accumulate. The first four miles the sandhills were steeper and closer together; these fell away, and the country opened out into extensive fields of spinifex, not a particle of any other vegetation; then again occasional forests of Casuarina were met with, but spinifex was everywhere; at 11, turned N. 26° W. for an apparent break or fault in the rock formation. Still travelling over fields of spinifex; these continued up to the foot of the hills, which were reached at noon: here was a tiny rivulet, but not a particle of feed of any kind for the camels. I now directed the caravan along the foot of the hills for three miles in a north-westerly direction when we entered into a broad open valley, in which was found a strong stream of water running to the southward; there was good feed for the camels, and while they were unloaded I rode to the head of the valley to reconnoitre. In the middle of this valley there is a singular mass of rock, around the base of which is now running a stream of beautiful water; reaching the head of the valley, I obtained an extensive view to the north of spinifex sandhill country, with a few low hills in the distance; to the N.W. I obtained a good view of the high range that was first sighted at the sandstone rocks and native well; from here it seems to be the eastern end of a very high range that extends to the westward. I am very sanguine of valuable and important discoveries being made there, and my hopes are raised by visions of better grassed and more hospitable country than that I have just passed over. It is possible that a watercourse from that range may flow into Lake Amadeus, a problem which I hope to solve in a few days time. The beautiful valley in which this camp is situated I named

Laura Vale, after the daughter of my companion, David Beetson. Although there is now a mile or more of running water, I can only express my regret that I cannot speak positively of its permanence. There do not appear to be any large rockholes in the gorges, which makes me feel doubtful of its lasting through the summer. Found an emu's nest with eight eggs, which were passably fresh. Marked tree $\overset{T}{5-89}$ at this camp. Bar. 28·300in, ther. 68° at 5 p. m.

Thursday, May 23rd.—Camp No. 33, Laura Vale. Bar. 28·300in., ther. 38° at sunrise.—The camels appeared to be doing well on the herbs and shrubs. A rest was necessary, as many of them are suffering from sore backs, and these require careful treatment; I therefore propose to stay here until Saturday and examine the hills, which indicate a metamorphic formation. Tested several specimens collected, and found no indications of metals. Bar. 28·255in., ther. 64° at 3 p. m.

Friday, May 24th.—Laura Vale. Bar. 28·275in., ther. 38° at sunrise.—Had emu egg fritters for breakfast to celebrate the anniversary of the birth of Her Most Gracious Majesty. Went up to the hills to collect further specimens and to determine the height of the highest point, which I found to be 281 feet above the plain. They are composed principally of a coarse red sandstone and quartzite, chiefly in large boulders piled in many curious and fantastic shapes, among which there are chasms and ravines which dip into the little creek that finds its way into the valley. Our camp is situated a quarter of a mile from the gorge, on the edge of the little clear stream which is only about a foot in width and the same depth. There are no evidences of it having ever extended beyond its present narrow limits. A few bloodwood trees, some kangaroo grass, a richer soil for a few feet on either side, together with a fresh appearance in the shrubs alone tell of the presence of water. It has probably been running since May 3rd, when we experienced the fall heavy of rain at Glen Edith; its course is southerly and it is lost in the sandhills about two miles distant. To the eye this is a very fertile valley with open forest and quite parklike in appearance, the waving white spinifex appears as long rich grass, the strangely shaped hills are covered with dwarf pines, the dark foliage of which contrasts with the deep red color of the rocks. Horses would have but little feed here, and since leaving Gill's Creek we have not seen an acre of grass land. A quarter of a mile from the glen, and at the point of a limestone rise on the creek channel, I have marked a tree $\overset{T}{5-89}$. I hope the next traveller passing along this way will find the water supply as good as it is now. From the highest point of the hill I took the following bearings:—The range to which I am steering bears 296° 30'; Mount Rennie, 103° 30'; a range, abrupt at each end, running east and west bears 340°, distant about forty miles; another low range bears 307° 45', distant twenty miles; an isolated hill about forty miles distant, 336° 30'; Mount Lyell Brown, in

the Magarey Range bears $68^{\circ} 30'$, distant about forty miles. Beetson planted a few seeds of the date palm, and peach, melon in the rich soil close to the running water at the camp, and as they will be protected from the frost by the long kangaroo grass it is possible they may survive. Mr. Ernest Giles, when at Glen Edith many years ago planted several kinds of seeds, but no results of his labors are to be seen there to-day. The insect kingdom so largely represented in these regions must devour the seeds before they germinate. I can account for the failures in no other way: but as his were planted in October, when the young plants would have the full force of a summer sun to contend with in their infancy, that may be the reason of their failure. Seeds planted after a strong heavy rain and at a more seasonable time of the year may succeed, but I have tried planting at all seasons and at all times with but the same disappointing result, even if one germinates and flourishes and cast its seed, these are greedily devoured by the myriads of ants that infest the whole interior. Took several photographs to-day. Rock specimens collected, Nos. 49 to 57. Bar. 28·210 in., ther. 68° at 5 p.m.

Saturday, May 25th.—Camp No. 34. Bar. 28·250 in., ther. 48° at sunrise.—Started at 10 past 9 on a bearing of $N. 65^{\circ} W.$, in three miles we were clear of the hills and then entered upon extensive spinifex plains with dwarf acacias and occasional clumps of mulga. Camped at 5·15 after travelling twenty-one miles; a few mulga bushes around the camp were cut down for food for the camels. No sign of any animal life met with to-day. Bar. 28·500 in., ther. 66° at 5 p.m.

Sunday, May 26th.—Camp No. 35. Bar. 28·540 in., ther. 52° .—Strong east wind, cloudy. Hastened away from this wretched camp at 8·20, buoyed up with the hope that the mountains now so close to us may be the threshold of a more promising country. Travelled for nine miles over the same flat firm spinifex country, when we came to a sandhill. One mile from this we were on stony country, where there were a few casuarina; turning northerly for two miles reached the eastern extremity of the range, here there was a small area covered with bloodwood trees and very beautiful grass. I cannot tell how frequently and how eagerly the glasses have been directed towards this feature, each time with the hope of detecting a dark line that would indicate the timber of a water-course; we have now arrived at the base of the bold, abrupt, and rugged bluff, evidently over 1,000 feet above the plain, but as yet no sign of a creek or even a drop of water. There is the most luxuriant green-feed for the camels, upon which they would do very well without water for a day or two, but they required food and rest quite as much as water, and as those requirements are to be met with here I decided to turn them out, and while the unpacking was being done I hurried on to reconnoitre. Travelled along the foot of the range over very stony ground, to the south was a part

of the range and a broad valley which I could see was clothed with spinifex. Ascending a hill I obtained a view to the westward round to south, but no sign of any watercourse to reward my eager gaze. Returned to the camp after a two hours ramble with feelings of bitter disappointment; it was too late to attempt the ascent of the main range. A few small gullies I had crossed, in which I eagerly searched for water, expecting to find running streams, were, with the exception of two small pools, quite dry. This range was sighted from camp 30 and from its height, apparent extent, and imposing appearance, I naturally anticipated it would give birth to a series of creeks that would run into Lake Amadeus. The question now arises, which way shall I proceed? From my hurried view of the horizon to the west there appeared to be no inducement to travel westward. From the summit of the range to-morrow I anticipate a very extensive view, and shall be guided in a great measure by what I then see. Where we are camped there are about twenty acres of beautiful pasture land, and it seems as if we had been guided to the only spot where any fertility exists. Fred. Warman in his rambles amongst the rocks discovered a little stream running for a few yards, from which we hope to fill our kegs, so that all anxiety for water is now over. Distance travelled to-day about twelve miles through dwarf mallee, banksias, and acacias from four to six feet in height, with occasional clumps of mulga and a few dwarf oaks. Bar. 28·410in., ther. 68° at 5 p.m.

Monday, May 27th.—Camp No. 35. Bar. 28·420in., ther. 51°.—The morning broke cloudy and threatening with a strong north-easterly cold wind. At 9·20 a.m. started to make the ascent of the mountain, taking Warman and Billy. Weei followed from choice, and so did Warman's little dog. Walking for a mile over the stony slopes at the base of the range we came to an almost precipitous ravine, which being the only place accessible, without walking another mile or two along the base, I decided to try this. The ravine was a mass of enormous boulders that had fallen from the cliffs many hundreds of feet above us; two or three monsters containing some thousands of tons each had, from their excessive weight, rolled far into the valley below. During our ascent pines were met with, growing and apparently thriving amidst the wreckage. Gazing up at the precipitous and almost overhanging masses of rugged and broken cliffs, dozens of huge pieces seemed ready at any moment to fall and overwhelm us. Two little pools of water were met with whilst ascending, but, if permanent, they can be of no use to anything but birds. On reaching the top of the ravine and looking down it appeared dangerously steep. From here a more gentle gradient led us to the summit of the mountain, a distance of about half a mile. Arriving at the highest point, which is at its eastern extremity, a strange wild panorama of desolation met our view: to the north round by west, and south-west, the distant horizon was unrelieved by a hill or range of any kind

whatever, spinifex plains extended as far as the eye could reach. The distant horizon was unbroken by an eminence of any kind, to the north round by north-west spinifex plains extend in a continuous line to what might be taken as a true horizon. The western end of a salt lake bore $261^{\circ} 30'$, while its eastern extremity bore $226^{\circ} 30'$, with low hills on its south shore. The lake does not appear to be of any great width, and I cannot think it to be in any way connected with Lake Amadeus. Mount Rennie bears $114^{\circ} 30'$, a high point in an important range south bears $96^{\circ} 45'$ (I much regret that this range did not lay nearer my course, for it is one of the most important features that has been discovered). The rock formation seen to-day appears to be a close, grained granite, of a pink color, and quartzite. The bold abrupt cliff which Mount Leisler presents to the east is reddened and rugged from exposure to the elements for untold ages. Upon the summit and in some places forming part of the cliff are enormous masses of conglomerate fragments of quartz and round pebbles, all cemented together apparently from pressure. Rock specimens, Nos. 58, 59, and 60, as well as a collection of stones found in great numbers at the base of the mountain were secured, from which the geologist will probably be enabled to give us some interesting particulars. I find the latitude of this point to be in $23^{\circ} 20' 09''$, but owing to the continued dull weather I have been unable to observe for variation of needle. This range I name the Kintore Range, after His Excellency Lord Kintore, our new governor, as a lasting remembrance of the first year of his appointment as a colonial governor. The highest point of the range I have named Mount Leisler, in grateful remembrance of Mr. Louis Leisler, of Glasgow, who so generously provided me with funds in my endeavors to open up the country between Fowlers Bay and the Musgrave Ranges. The height of Mount Leisler above the plain is 1,462ft. A pile of stones six feet high is built upon its highest and most easterly point, and in the grass valley at its foot and at our camp a bloodwood tree is marked $\frac{T}{5.89}$. From the top of Mount Leisler the Magarey Range is distinctly visible, and north of it is a conspicuous range bearing $83^{\circ} 45'$, which I have named the Henty Range, after Francis Henty, Esq., of Victoria, and the highest point of that range I have named Mount Russell, after T. Russell, Esq., of Toorak, Victoria. A high and very imposing range appears in the dim distance upon a bearing of $41^{\circ} 30'$, the highest point of which I should say must be fully 2,000ft., this I have called the Campbell Range, after the Hon. Dr. Campbell, M.L.C., and chairman of the board of directors of the association, and the very high point of that I name after the Hon. Dr. J. A. Cockburn, M.P., Chief Secretary and Premier of South Australia. A line of hills bearing N. 25° E. and distant about twenty miles, I have named after Mr. Ecclestone Du Faur, of Sydney, who for very many years has endeavored to unravel the mystery attached to the last resting place of Dr. Leichardt;

the highest point in that range I have named after David Lindsay, Esq., F.R.G.S., the Northern Territory explorer. The ascent of Mount Leisler occupied over two hours, though both Warman and Weei accomplished both the ascent and descent in far less time than I did. I notice again with surprise the presence of swamp hawks, or bromley kites, about our camp. I have always been under the impression that they only frequented well watered country, I have certainly never met with them away from it. With feelings of bitter disappointment I retraced my steps to the camp. My wanderings through dreary and desolate regions to find the goal of my long cherished hopes in a still more desolate waste was a sad frustration that I had little anticipated. I omitted to mention an important range of hills that was observed from the summit of Mount Leisler, they bore 178° and were distant about fifteen miles; these I named the Davenport Hills, after Sir Samuel Davenport, K.C.M.G., &c., president of the South Australian Branch of the Royal Geographical Society.

Tuesday, May 28th—Camp No. 35, Kintore Range, foot of Mount Leisler. Bar $28^{\circ}330$ in., ther. 58° . Weather cloudy and dull, with N.E. wind.—I am loth to leave this range without making a further examination to ascertain whether any permanent water exists here. Instead of starting to-day as I intended, I sent Warman and Weei in a southerly direction, whilst Billy and I proceeded to the north. We travelled over the stony slopes of Mount Leisler; for two miles these are covered with dense mulga scrub, which made our travelling tedious and slow, we then emerged into an open valley with bloodwoods and a few white gums, this raised my hopes for it appeared like a watercourse, which it was, but perfectly dry. A few small grass patches of an acre or two were now met with, surrounded with spinifex. The watercourse where we left it appeared to be trending towards the lake, but it is doubtful if it extends so far; the probabilities are that, when its waters flow, they are lost in the sea of sand. Leaving the dry creek we turned easterly to examine a high range, 1,200ft. above the plain; we reached its western base in two miles, and travelled along its northern slopes for two miles; a few little runnels full of stones leave its almost perpendicular sides, but there is no formation whatever for holding water; both here and at Mount Leisler the stones are shivered by some convulsion of nature, apparently at no very remote period, into fragments that are now to be found at their base, the water falling percolates through these and is lost for ever, though, doubtless, it fulfils more important designs beneath the surface, which we cannot comprehend. We returned to the camp at 4 p.m., having ridden all day over most dreary and desolate country. The natives visit this place apparently to light their signal fires, the great height above the surrounding country being particularly favorable for such operations—the remains of some are to be found right on the summit of

Mount Leisler. The native population must be very small indeed, as not a vestige of a camp has been seen anywhere. The high mountain visited to-day, which is northerly about four miles from Mount Leisler, I named Mount Strickland, after Sir Edward Strickland, the president of the New South Wales Branch of the Royal Geographical Society of Australasia; it is 1,200 ft. above the surrounding plain. Warman was also unsuccessful in his search for water. We may therefore conclude that this range is *absolutely waterless*. Our kegs have been filled from a rain water-hole on the south side of Mount Leisler, but the supply is not sufficient for our requirements for a week at any time. Light rain commenced to fall on my return to camp; put the saddles under a tarpaulin, for there is every indication of a wet night.

Wednesday, May 29th—Camp No. 35, Kintore Range, foot of Mount Leisler.—A steady rain fell all night, and at daylight heavy showers fell at intervals. As there is no appearance of the weather clearing up; there is nothing to do but make everything as snug as possible and wait till the rain ceases. Our tent accommodation is not of the best, but with props and stays we endeavor to keep ourselves and provisions dry—though by no means successful with regard to ourselves. At nightfall the cadences of the wind, as alternately they pass gently and mournfully by the mountain over us, and in other moods of fury and rage they scream and roar around its rugged weather-beaten cliffs, do not cheer us in our present situation; and if we accept the position of the huge boulders around its base as evidence of the fury of the storms frequenting this spot, then the elements do not rage in vain: but we are satisfied with the present surroundings, without wishing for ocular demonstration of such phenomenal disturbances.

Thursday, May 30th.—Bar. 28.075 in., ther. 58°.—Furious squalls of wind and heavy rain beat against our slender shelter nearly the whole night. The surroundings of the camp at daylight were dismal—mud and puddles everywhere, the fire a blackened beaten-out heap of ash, and still raining. At last a fire was made, and a pot of hot tea having been passed round which with a warm at the fire cheered us up a little, although there is no possibility of getting away to day. The rain continued until 4 p.m. Mount Leisler and the hills around have been enveloped in fog, mist, and rain for two days. An estimate of the rainfall may be gathered from the fact that a 2 lb meat tin (Conrad's), measuring 4 in. diameter and 5½ in. deep, had caught 2¾ in. of water. Notwithstanding our well chosen position, the rain found its way amongst our provisions, but altogether no special damage was done. The camels have benefited by the few days' rest upon the very luxuriant grass flat at this camp.

Friday, May 31st.—Camp No 36, sandhills at south end of low hills. Bar. 28.210 in., ther. 60°, bright, fine, and clear.—Everything out drying this morning, and upon this and other accounts

we did not get away until 11.45. The ground was very soft in many places. Started on a bearing of S. 82° W., which in two miles took us clear of the surrounding hills. At this point we found a brisk little stream running, the result of the late rains; the water continued to run for a quarter of a mile, and was then lost in the sands. From here we took up a bearing of S. 80° W. towards the south point of low hills; travelled over spinifex plains for six miles, then desert oaks and an occasional sandhill were passed. Camped at 4.45 at the south end of stony hills, on a sandhill where there was fairly good feed for the camels, having come about nine miles from Mount Leisler. From this point Mount Leisler and the Kintore Range form a noble and imposing spectacle, but instead of offering rest and shelter to the weary traveller through these dreary wastes, it must always be viewed as a beacon of warning, like the lighthouse at sea which warns the mariner of points of danger. So the only practical result of my visit to Mount Leisler is that this mountain will fulfil a useful purpose by warning the future traveller to avoid its dry and waterless surroundings. Even in times of heavy rains it would be far better to try any of the lower hills or ranges in the locality. Bar. 28.400in., ther. 64° at 5 p.m.

Saturday, June 1st.—Camp No. 37. Bar. 28.470in., ther. 44° .—Morning fine and bright. The dew was so heavy last night that everything was saturated. As the camels were at hand, we got away at 8.15. Our waterkegs when I left Mount Leisler were not so full as they should have been, and before entering into the sandhill country I was anxious to replenish them; so with this view I started the caravan towards the line of low stony hills that were about ten miles distant, and bearing N. 55° W. travelled over spinifex country, and upon reaching the foot of the hills found a little running stream that was the result of the rains that fell while while we were at the Kintore Range. While the kegs were being filled, I went to the top of the low range to take angles. Observed a range of hills bearing N. 80° W., distant about thirty miles. These I named after the Minister of Education, &c., the Hon. J. H. Gordon, M.L.C. Another line of hills bearing N. 25° E., distant about twelve miles, I named after Mr. Charles Winnecke, F.R.G.S. of Adelaide. The Du Faur Hills appear about thirty miles away. I carefully and repeatedly scanned the western horizon, but no distinctive features appeared above the oak forests that extended in that direction. The kegs being filled I started upon a bearing of S. 64° W. for the lake; travelled through oak forest for eight miles, and reached the north shore. At the point we struck the lake the eastern end was distinctly visible, so that I think it can form no part of Lake Amadeus. The view across the lake was much distorted by mirage. A range of hills appeared upon its south shore, distant about thirty miles. The lake seemed to extend indefinitely to the southwards upon

either side of this range, and the whole surface appeared to be covered with water. The range of hills upon its south shore, and which are distinctly seen from the Kintore range, I have named after Mr. J. L. Bonython, a member of the Council of the South Australian Branch of the Royal Geographical Society. As I gazed on this apparently extensive lake, I could not but contemplate the fact that our party were the first and only Europeans whose eyes had ever beheld its silent shores. Was this Lake Amadeus? If not, to where does it extend? The mirage of the wilderness is apt to deceive the traveller, and although I have doubts of the eastern boundary as it now appears, I feel certain that this forms no part of Lake Amadeus. From Camp 30 (the native well at Sandstone Hills) I looked repeatedly in a south-west direction without being able to detect the peculiar appearance the horizon has when a salt expanse intervenes, and which may be best described as a "blink" (to adopt an Arctic explorer's word) and this would have been more particularly noticeable having a high range on the horizon in that direction. The view of the lake, though somewhat dreary and lifeless, formed nevertheless a pretty landscape, or would be so to one who knew not that the water was brine, and that it was a country abandoned by man and beast. I was very glad indeed to notice several claypans full of water, and where we struck the lake there was good saltbush, samphire, and other salsolæ. Following westerly round its shores, and trying to make a short cut, we got into the mud, and the floundering out was a long process. It is by far the best way, when traversing such a lake, to go round everything, no matter how far it looks. Spinifex and dense oaks grow to the very edge of the lake. No track or sign of any animal life. The lake seems a mass of channels, islands, and peninsulas. Travelled till 4.45, and camped in a small patch of saltbush; the camels were let out for the night. Travelled twenty-one miles on all courses, which, after striking the lake, were N. 70° W., one mile; S. 60° W., two miles; N. 20° E., two miles; N. 80° W., three miles; S. 30° W., one mile; N. 80° W., two miles. Bar. 28.575 in., ther. 56° at 5 p.m.

Sunday, June 2nd.—Camp No. 37. Bar. 28.580 in., ther. 40° ; S. latitude $23^{\circ} 22' 14''$; E. long. $128^{\circ} 27'$ —This was a bright and lovely morning, the bristling spinifex was glistening in the bright sunshine with heavy dew drops, the strange silence of the solitude of the desert is unbroken, not a note of a bird or even a sound to indicate that any living thing exists here, nor any sign or trace to show that animal life has ever visited this spot. The lake at this point is an enormous expanse of brown mud, save here and there some sheets of water towards the centre. As there was very good saltbush feed here I decided to remain. Owing to the wet weather the camels' saddles require constant altering, and many of their backs are now in a dreadful state. My position is now in the province of Western Australia; my immediate movements will be

guided, of course, by the distance this lake extends to the westward, but I do not think it goes much further in that direction, whatever it may do to the southward. I have now soon to decide whether it be advisable to continue westward, or to follow round the lake, and so determine its outline to the southward. I see no feature of interest to induce me to continue west unless prepared for one hundred miles or more of oak forest, spinifex, and sandhills, for I feel sure that no alteration will take place until the watershed of the River Murchison is reached. As a geographer, I would much like to continue on until the west coast is reached, and so decide beyond all doubt, and for ever, the nature of the country, but my instructions direct me to endeavor to discover minerals and pastoral areas, and as neither may be hoped for in the west, it is most probable that I shall complete the circuit of this lake and then travel eastwards towards Lake Amadeus. Bar. 28·560in., ther. 77° at 3 p.m.

Monday, June 3rd.—Camp No. 38; S. latitude 23° 23' 13". Bar. 28·515in., ther. 40° at sunrise.—Very heavy dew, morning fine, bright, and clear. Started at 8·35, N. 40° W. for two miles, then turned N. 60° W., skirting some samphire swamps which is much better travelling for the camels. In one mile upon this bearing the spinifex sandhills that have hitherto run down to the edge of the lake gave way, and extensive saltbush flats appeared, upon these were numerous clay pans near which the ground was soft and boggy from the recent rains, the grass and herbage was green and most luxuriant; these flats were lightly timbered with mulga and prickly acacia. Continued on this bearing for five miles when spinifex sandhills with oaks again set in. Not seeing anything of the lake I turned S. 15° W., and in three miles met with samphire swamps, continued among these for two miles when further progress was entirely stopped, for we were in a labyrinth of salt swamps in which the camels were several times bogged, and I was compelled to return for three miles upon my tracks; then being a little clear of the swamps I turned S. 80° W., this course took me over open spinifex country with oaks, and in four miles camped in a clump of oak timber; travelled fourteen miles, having lost much time among the samphire swamps. Bar. 28·505in., ther. 68° at 5 p.m.

Tuesday, June 4th.—Camp No. 39, S. lat. 23° 26' 47", E. long. 128' 12". Bar. 28·480in., ther. 56°.—Started at 1·20 upon a bearing of S. 40° W., but I had only gone over one sandhill when I observed that further progress in that direction was stopped by a labyrinth of salt lagoons. Upon the higher ground, which might be termed the islands, I noticed the vigorous growth of casuarina or oak timber. Some little time was lost in endeavoring to cross a salt arm, only a few yards across, and which seemed firm under foot, but the moment the first two camels of the caravan were on it, down they went in the blue mud underneath. After a long struggle they were got out, and I stood away on a bearing of

N. 64° W., in about eight miles I reached a low stony rise, at the foot of which a broad sandy flat appeared, upon which I noticed a number of white gum trees growing. From the top of this rise I obtained an extensive view to the west and north-west. I noticed a line of hills just on the eastern extremity of the Gordon Range, which is about eight miles off. These hills were distant about eighteen miles, their most southerly end being marked by two distinct hills close together and higher than the rest. I have named these the Dovers Hills, after my cousin, W. Dovers, Esq., of Bombala, New South Wales. Upon a bearing of N. 45° W., distant about twenty-eight miles, I noticed another range, which I named after the Hon. J. H. Angas, M.L.C., one of the directors of the association. Upon a bearing of S. 82° W., I noticed a line of hills running north and south, the highest point being at their northern end. I have decided to go no farther in that direction, so prepare to turn upon a bearing that will take me to the south-western shore of the lake. This line of hills, the most westerly feature seen, I named the Baron Hills, after the Baron Sir Ferd. von Mueller, K.C.M.G., F.R.S., President of the Victorian Branch of the Royal Geographical Society, whose name is justly entitled to stand forth conspicuously at the limit of my most western travels; as the baron has been for 20 years the most steadfast and energetic promoter of Central Western Australian exploration. I much regret that one of his most ardent wishes, a travelling-stock route from Central Australia to the North-West Coast, has, in this journey, received another check; nothing would have been more gratifying to me than to have been in a position to have given proof of this being practicable. At 11.45 I turned upon a bearing of S. 60° W. There is a large area of burnt ground here, leading me to infer that a good water will be found in either in the Gordon hills or else at the lake close by. I continued upon this bearing for about three miles, and then turned south, for it is now evident that the extreme western end of this salt depression has been reached; we were occasionally turned off our course half a mile by salt reaches. At 4.30 arrived at one, near which there was a large cane-grass clay pan, which will last a month or more of such weather as we now experience. Here there was a profusion of splendid feed for the camels, and as one of them is ailing I shall stay here to-morrow. From some remark of Billy's, I think he must have seen a spring in the early part of the day, and to-morrow I propose to return and examine the spot. Oaks and melaleuca were the only trees seen. Three ducks and eight cranes were seen on the clay pan, these flew away towards the south-west, but afterwards returned and hovered about the clay pan. Bar. 28.560 in., ther. 62° at 5 p.m. The night set in dark and threatening, so had everything packed and under cover in case of a downpour.

Wednesday, June 5th.—Camp No. 39, at Cane Grass Claypan.

Bar. 28·600in., ther. 54°.—Cloudy. A few drops of rain fell last night. Started with Billy to visit the position spoken of yesterday, but saw no indication of a spring. There were some very fresh-looking acacias at the spot, but no sign of water; these trees had misled Billy. From here took up a westerly bearing to see if any more swamps lay in that direction; travelled till noon over heavy sandhills, with oaks and spinifex, that further travelling in that direction with my objects was undesirable. The country to the west appears to have formed so decidedly into spinifex sandhills, that it would be useless my entering into it unless prepared for one hundred miles of such country. With feelings of regret, I now turned my steps south. My duty and instructions told me to go no further west, and, however much in the interests of geographical science I longed to proceed in that direction, there was no inducement for me to risk the attempt. Returned to the camp over the same country, which has recently been burnt by the natives, who appear to visit this locality while water exists in the clay-pans. Although a sharp lookout was kept, no natives were seen. Reached the camp at 2 p.m. Bar. 28·500in., ther. 64° at 5 p.m.

Thursday, June 6th.—Camp No. 40. Bar. 28·580in., ther. 48° at 6 a. m.—Weather fine and clear. Left this camp at 8·30 on a bearing of S. 34° W., for in my rambles yesterday I could still see traces of a low-lying samphire swamp country. Travelled over oak and spinifex sandhills for four miles and then turned S. 15° E. towards a line of hills that were timbered in some places with pines and in others by mulga scrub; these hills appeared to me to be either being fast covered up with sand, or else were gradually being laid bare of sand. I have named these after Mr. Turner, of the Adelaide University. Upon this bearing gypsum earth mounds were met with; oaks, ti-trees, &c., and little mallee were the only trees seen at this spot; at three miles turned on a bearing of S. 60° E. towards a low stony isolated hill; travelled over some very nicely-grassed mulga flats with many claypans in which was plenty of water; reached the hill in four miles, from its summit a good view was obtained, the most southerly end of the Angas Hills about forty miles distant, on a bearing of N. 35° W.; the Gordon range, N. 10° W., and the Baron range, 275°, about fifty miles distant. Continued upon the same bearing for two miles, and then turned S. 76° E.; in two miles we reached a pretty mulga flat with rich grass and large claypans; there were a number of native camps here the first seen since leaving Laura Vale, giving evidence of a large native population occasionally visiting this locality. Travelled till 4·40 p.m. over mulga flats well grassed and with occasionally belts of scrub; two or three very large claypans were passed, besides many smaller ones, all containing water. It was a great relief to the camels being for one afternoon off the spinifex, and they walked along grandly and at night were let loose upon splendid

feed, green herbage. I observed to day a great number of ant tunnels made of the resinous substance at the root of the spinifex; they appear to be built for protection, either from fire or the fierce heat of the summer sun, and are to be seen on the sandy surface of the ground extending from one spinifex bush to another; at the end and in the root of the spinifex is the nest; the longest tunnel I have seen measured about twenty feet long; upon picking up the tunnel and, of course, thereby breaking it, the busy insects are seen hurrying to and fro, carrying their eggs, seed, or material; even on piece of ground recently burnt, I have noticed that the ant tunnels and nest remain uninjured. I have at last gained the extreme western end of this salt lake formation, and the character of the surrounding country is such that it leads me to think it will never be again visited; but for the claypan water, it would have taken more than double the time to accomplish its examination, and then not without considerable risk. It is now beyond doubt that no streams run into this lake from the west or north-west, and the inference is that in about one hundred miles or less to the west the sandhill formation would gradually merge into the elevated plateau of gravelly undulations. met with by Giles's Expedition of 1874. I now turn my back on the west with feelings of disappointment, and as I have some interesting problems to solve to the eastward, the time allotted to me for being in the field will be pretty well occupied in determining the outline of the lakes, although I cannot but now think that Lake Amadeus will not cover anything like the extent it is supposed to. The quondong tree was met with to day; no animals or birds were seen. Bar. 28·575in., ther. 58° at 5 p.m.

Friday June 7th.—Camp No. 41. Bar. 28·600in., ther. 36° at sunrise; heavy dew; weather still cloudy.—Left camp at 3·45 a.m. on a bearing of N. 5° E. Travelled over well-grassed mulga hills; in three miles came to some old wurlies; several claypans and good grass with saltbush were found at this point. I now turned on a bearing of S. 75° E. expecting to meet the south shore of the lake, for from the appearance from the spot where we first struck the lake it seemed to be almost at the Bonython, towards the western end of which I have been steering. Soon after leaving the natives' camp, we entered into a dense mulga scrub, which in three miles opened out into spinifex undulations with limestone. At mid-day, from a low hill, I obtained a good view of the lake, its south shore, to my great surprise, was five miles to the north of us. I immediately changed my course to S. 20° E. to reach the western end of the Bonython Range. Arrived at these hills in about two and a half miles, but was unable to find any good camping place, there being no water and very poor feed for the camels. Being anxious to fix their position and height, also to take bearings, I decided to turn out the camels, although we had only travelled fourteen miles. So soon as the camels were unloaded I went with

Billy to the highest point, which, by aneroid measurement, I found to be 800 feet above the lake. An extensive view was now obtained, Mount Leisler bearing 50° , the east end of the lake $50^{\circ} 30'$, the farthest point across the lake 17° , the west end of body of the lake 351° , but several reaches or arms lay beyond low hills bearing $33^{\circ} 30'$, distant about 30 miles; the Gordon Hills 318° . From $S. 20^{\circ} E.$ to $S. 40^{\circ} W.$, low hills appeared from ten to fifteen miles distant, the intervening country being desert oak sandhills, showing many places that have been burnt by the natives. The Davenport Hills bear from $69^{\circ} 30'$ to 79° which is their lowest point. The rock formation of the Bonython Hills is a limestone and calcareous rock, they run for nearly five miles in an east and west direction and are two miles through from north to south and appear to be perfectly waterless; even the late heavy rains have been absorbed, as no indications could be found of any of the little gullies having had running water in them. Collected rock specimen 70, which shows formation of these hills. This morning passed over a few miles of really splendid pastoral country, grass, saltbush, and mulga, with claypans full of water. No birds or animals seen to-day. Occasionally saw the smoke of fires of the natives, but no sign of the natives themselves. Bar. 28.425in. , ther. 58° at 5 p.m. I should have mentioned that this range is easily seen from Mt. Leisler, both from that point and where I first struck the north shore of the lake it has a most attractive appearance.

Saturday, June 8th.—Camp No. 42, S. shore of Lake Macdonald. Bar. 28.500in. , S. lat, $23^{\circ} 35' 52''$, ther. 54° . Cloudy and still like rain.—Much disappointed last night in fixing the position of the hills; clouds were heavy all night and as this is anything but a pleasant camp we hurried away at ten past eight on a bearing $N. 35^{\circ} E.$ The south side of the lake is only five or six miles off, and I shall camp there, for I do not wish to leave this important feature without fixing its position. Travelled over stony slopes covered with mulga for two miles, then entered into a desert oak and sandhill country which cut short the career of any little water channels that leave the range. In six miles we reached the south shore of the lake, here there was abundance of camel feed, and after a short search I found a claypan which would meet all our requirements for one day. Being a cloudy dull day, it was most favorable for observing the outline of the lake. In a northerly direction, the opposite shore was just visible. East and west the distance is about the same. On a bright day this would be very much altered by the "mirage of the desert sea," and as with me, when on its northern shore, the Bonython Hills appeared to be an island, the lake extending far beyond the reach of vision east and west of the hills, so making it appear very much larger. The day was occupied by me in mapping and posting up. Several of the camels have very bad backs, and their saddles required attention. Saw two swamp

hawks and one crow; no animal life. The lake I estimate to be about fifteen or eighteen miles east and west, and about twelve miles from north to south; of course this does not include the miles of arms thrown out from its western side. The water in the lake is apparently very shallow, no streams whatever run into it. Having now satisfied myself of the insularity of this lake, I named it Lake Macdonald, after Mr. A. C. Macdonald, the energetic secretary of the Victorian branch of the Royal Geographical Society of Australasia. Bar. 28·725in., ther. 62° at 5 p.m. (at level of bed of lake).

Sunday, June 9th.—Camp No. 43. Bar 28·760in., ther. 46° (at level of lake bed).—Left this camp at 8·45 a.m. to trace the lake to its eastern limits, which, to judge from appearances, cannot be far, but appearances here are rather delusive. Taking up an easterly course we travelled for four miles on its south shore, the lake here being but a quarter of a mile in width. Here it abruptly ended, and we were face to face with the high spinifex sandhills and forests of well grown desert oaks. I had now travelled the three sides of the lake, the south side having no samphire swamps or marsh land on its boundary, whilst the eastern side appears to be bounded by spinifex sandhills. Having arrived at the eastern extremity of the lake I now determined to proceed in search of Lake Amadeus, and altering my course S. 82° E. I was also anxious to determine the position of a range of hills which I had named the Davenport Hills. The sandhills here which are high fortunately tended in an east and west direction, so that we were able to keep in the valleys. At about nine miles, and from the top of a high sandhill, Mount Leisler bore N. 26° E., and the north end of the Davenport Hills N. 50° E. From this point the country opened out into spinifex plains with an occasional sandhill, the forests of desert oak fell away into occasional clumps, and with the exception of a few stunted acacias and banksias the landscape was white with the long bleached straw stems of the spinifex. This continued to the foot of the hills which we reached in about sixteen miles from our camp on the lake. Ascending a little hill I obtained a view to the east and south, observing a line of low hills to the eastward I continued on the same course to reach them. Passed over the same open spinifex country, and camped at 4·40 p.m. amongst a few oaks and bloodwood trees. There was but scanty feed for the camels, and at 7 o'clock they were brought up for the night. Saw the smoke of two fires to-day but no sign of the natives. The Davenport Hills which I visited to-day are about 500ft. above the plain, and are a very prominent feature, being about eight miles long from east to west. Rock specimen No. 71 collected from these hills. Estimated distance travelled, nineteen miles. Bar. 28·525in., ther. 68° at 5 p.m.

Monday, June 10th.—Camp No. 44. Bar. 28·525in., ther. 62° at sunrise.—A few smart showers fell during the night, and at

daybreak blankets and everything about the camp were saturated; saddled up and started at 8:30 a.m. From the top of a sandhill at the camp I had obtained a good view of the hills to the eastward, and could not form a very favorable opinion of them, and as they were considerably out of the course I wished to take I decided to leave them unvisited. Some low hills lay to the south, and towards them I directed the caravan upon a bearing of S. 5° E. The rain cleared off soon after we started, but it continued cloudy all day. Passed over open spinifex plains dotted with a few oaks and dwarf acacias. In three miles heavy sandhills running east and west set in, which puzzled some of the camels and retarded our progress. In six miles from the last camp reached the west extremity of a low sandstone ridge, where Billy found a small cleft in the rock, and full of water. Here we replenished the kegs, which was all I required, the hole was 5ft. deep and about 2ft. wide. Several native camps were seen here, and the water must last these people for a considerable time. In a cave close by were the idle or playful drawings on a stone wall representing and signifying nothing in particular. The vertebræ of a few snakes were lying near the black cinders of a fire, showing upon what the people at times look for sustenance. Turning a little to the eastward to get through the hills we resumed our journey, and in two miles noticed the fresh tracks of three natives going to the westward, and soon after noticed a wurlie made to shelter two men from the rains that probably fell when we were at Mount Leisler. At this point I obtained a very distant view to the south and south-west, which presented nothing whatever but high spinifex sandhills with an occasional knoll of sandstone. Directing the caravan to one of these which lay S. 15° E., and where I hoped we should obtain a little feed for the camels for the night, we continued over very heavy sandhills. In about thirteen miles I turned S. 40° E. to a more inviting looking ridge, which we reached in about sixteen miles. This was a most dreary and inhospitable spot, huge sandhills in confused and irregular masses tumbling right up to the foot of the cliff which must soon be buried by them. Ascending the cliff with Billy he pointed out to me a particular burnt patch, it was not the only one by any means, there were dozens, but Billy seemed convinced that water was there, and as it lay south I directed the caravan thither; in about nineteen miles we reached a mulga hollow at the foot of, and on the west side of sandstone knolls. Numbers of native wurlies were soon discovered, and a grassy glade dotted over with mulgas. Little stone runnels, now dry, intersected this pretty little piece of woodland. Billy soon found a native well, and after that a rock waterhole. From the number of wurlies and encampments, this is evidently a place of frequent resort by the natives, none were here now, and at 4:40 p.m. we turned the camels out upon pasture they love best. I find the well is similar to the one found at Camp 31, and about five feet deep to

the water; it is now filled up with sand and is only used, I imagine, when the rock water has dried up, and as that has such a noble catchment area of rock sloping into it, it must be a rare thing for the blacks to have to appeal to the well, their requirements for water being confined to what they actually drink, using none for either washing or cooking. This reservoir must be viewed by them as permanent. Rock specimens No. 72 collected from the rock formation of banks south of the Davenport Hills. Bar. 28·110in., ther. 68° at 5 p.m.

Tuesday, June 11th.—Camp No. 44; S. latitude 23° 53' 10". Bar. 28·150in. ther. 58° at sunrise. Dense fog this morning, which did not lift until mid-day.—I deem the position of this spot of sufficient importance to fix its position, and as it was too cloudy last night, I have decided to stay here to day in the hope of a starlight night. On a careful examination of the rock water, I find it is about 6ft. deep. 10 yards long, and 5 yards broad, and is situated about 200 yards southerly from the well. It is on the top of a stony rise, with nothing to indicate its presence until you are at its brink, sandstone rock being all round. The peculiarity of these hills—ridges I think would be the more descriptive word—is that they are nearly surrounded and covered with mulga scrub. Several smaller rock holes are in the vicinity, and at the foot of their western slope the traveller will find some few hundred acres of excellent grass land, good feed for horses or camels, which in this region is almost as scarce as water. Several little channels and runnels have only just stopped running, although it is now a fortnight or more since the rain, showing, I imagine, that, although the upper rock is split or broken up into confused and irregular masses, there lies below an unbroken surface, which, dipping to the west and receiving the rainfall from the rocks overlying them, discharges the water into the little creeks to the westward, where the sandhills immediately swallow it up. Directly around this locality are small outcrops of white sandstone, the exposed surface of which is reddened from decomposition, giving them almost a purple appearance, which is heightened by contrast with the sombre foliage of the mulga that grows round about them. The pine trees usually found on sandstone banks are not found here. The smoke of native fires were seen around, but no natives put in an appearance. These rocks and reservoirs I have named the "Warman Rocks," after one of my companions on this and other journeys in the interior. Owing to the continued clouded weather I have been unable to fix my position during the past two or three days, but this morning took observations, and found my latitude to be 23° 53' 10". Bar. 28·100in., ther. 78° at 5 p.m.

Wednesday, June 12th.—Camp No. 45. Bar. 28·125in., ther. 61° at sunrise. Sultry and cloudy, with appearance of rain.—These banks of sandstone run north and south, Mount Leisler bearing N. 10° W. Started at 8·10 a.m., on a bearing S. 46° E.

In three miles sighted what I have always called Blood's Range ; this range was seen from Camp 31. It has a bold and imposing outline from this point, with a gap or pass at its eastern end. The western portion of the range, which forms one side of this pass, is by far the highest peak. From this point we lost sight of everything, and appeared to enter at once into a low-lying tract of sandhill country, with oaks and spinifex. It was in vain I ascended the highest sandhills that lay near our line of march, the line of vision being intercepted in less than a mile. We passed the whole day in forests of oak and spinifex. The country seemed to be swept of every kind of bush ; the white stalks of the spinifex contrasting strangely with the tall straight dark stems and foliage of the oaks. The sandhills were low and somewhat distant from each other, and the ground being tolerably level, we made about twenty-one miles. Camped at 5 p.m. without feed or water for the camels, so they were tied up all night. No animals or birds of any description were seen to-day, our route being through the centre of Lake Amadeus, as now shown on the maps. Bar. 28.450in., ther. 72° at 5 p.m.

Thursday, June 13th.—Camp No. 46. Bar. 28.580in., ther. 58° at sunrise.—Last night was threatening and cloudy, with a shifting wind. A few showers fell—just sufficient to make us turn out and cover up our belongings. Started away on a bearing of S. 46° E., the sandhills running east and west, with wide valleys between them. In nine miles turned S. 30° E. Here the sandhills became higher and more confused, with poison bush everywhere. At sixteen miles from last camp crossed some small samphire swamps ; at seventeen miles passed a saltpan on the east side of which were some claypans with water in them. Wishing to make a good day's stage, these were passed. From the appearance of the country I anticipated meeting with more, and that probably I was approaching the western extremity of Lake Amadeus. At this point the sandhill formation ceased, and flat sandy country with grass, salt-bush, and mulga were passed over. Here there were quondong, prickly acacia, and quite a patch of good country for stock, but apparently quite waterless. At 4.30 camped, having travelled twenty-one miles. Upon such good country I deemed it safe to let the camels go for the night. I was anxious to obtain an observation for latitude, but the night turned out cloudy, as, indeed, it had been all day. Bar. 28.650in., ther. 62°.

Friday, June 14th.—Camp No. 47. Bar. 28.600in., ther. 52°. Light southerly wind, light clouds.—My riding camel, "Tooroo," made a mistake last night and wandered away by himself. This caused considerable delay, and I did not start from this very pleasant camp until 10 o'clock. Taking up a bearing of S. 15° E., we continued over well-grassed saltbush and mulga flats for two miles, when we again entered into spinifex and oak sandhills entirely destitute of any other vegetation. It is over such tracts

of country as this that the traveller must push his way, for there is absolutely nothing whatever that animals can eat. Continued on this course for eight miles, and was distant from what I take to be Blood's Range, of Giles, about ten miles, and it was quite evident that no lake, or arm of one, lay between us. At this point I turned S. 50° E. The same country continued on this bearing, but the sandhills were farther apart and running regularly east and west, with wide valleys between them, in which were occasional clumps of dense mulga scrub. Camped at 5 p.m., having travelled twenty miles. There was but little feed here for the camels, so at dusk they were tied up for the night. The night set in dark with heavy clouds banking up from the west, and, most strange for this time of the year, heavy thunder and very vivid lightning. Had the saddles stacked and under the tarpaulins. No timber being at hand, I could not put up my tent. Bar. 28.325in., ther. 61° at 5 p.m.

Saturday, June 15th.—Camp No. 48; S. latitude $24^{\circ} 33' 21''$, var. $0^{\circ} 26'$. Bar. 28.400in., ther. 52° .—Heavy rain commenced at 8 o'clock last night, and continued with great violence till 3 a.m. this morning, violent squalls of wind and rain being followed at intervals by steady soaking rain. My companions managed to secrete themselves among the saddles under the tarpaulin, but, this being so thin and worn, it offered but indifferent shelter; the fire was beaten out, and I passed a very wretched night. At 3 a.m. I rolled myself up in a blanket and slept till dawn, when I let the camels go for an hour or two. We were all wet through; but, a fire being lit and a pot of tea passed round, we were soon in better spirits. An idea of this rainfall may be gathered from the fact that a 2-lb. meat tin was quite two-thirds full this morning, and a tin dish more than half full. At 9.15 we started away on a bearing of 90° . At two and a half miles turned S. 75° E. to examine a peculiar and abrupt outcrop of rock. Travelling over spinifex and oak sandhills with a bald stony hill to the north of us. Continued on this course for two miles, and then turned N. 70° E. for the south side of the rock, which we reached in seven and a half miles from our last camp. Billy went on foot to examine the north side, while I continued on the south side. In a quarter of a mile reached some old native encampments, where there was a small stream of water running for a few yards into the sands. These, of course, were the result of last night's rainfall. I decided to stay, for the camels required rest and all our belongings wanted drying. There is fairly good feed here for camels, and some rough grass for horses; but the area of such is small. Billy returned from his ramble round the rock, and reports having found a rock reservoir of considerable dimensions. Later in the day he managed to bag a brace of rock wallaby. Any such small game help to eke out our now slender supply of meat. Bar. 28.350in., ther. 54° at 5 p.m.

Sunday, June 16th.—Camp No. 48, Sandstone and Pine Rock. Bar. 28·500in., ther. 32° at sunrise.—Everything was white with frost this morning. Employed during the day drying plants and clothes, taking observations for latitude, variation, and time. From this camp there is an extensive view of hills and ranges to the south and south-west. The lofty peaks of Blood's Range in the clear morning air assume a variety of tints, while the numerous ravines and gorges suggest innumerable little streams of water running their limited extent into the sandhills of oak and spinifex. The peaks of Blood's Range have such an imposing appearance that I propose to visit them to-morrow.

Monday, June 17th.—Camp No. 48. Bar. 28·500in., ther. 33°.—I found my work so much in arrears that I decided to remain here to-day. In the afternoon Billy, Weei, and myself went to examine the rock and the reservoir. The rock is about eighty or one hundred feet high and perhaps half a mile long from E. to W., and is composed of sandstone and quartzite and covered with well-grown pine trees; at its eastern end I noticed a few white gums and bloodwood trees growing, while the south side is abrupt showing many little bays and cliffs of brown rugged rock, its northern side slopes more gradually and spinifex grows nearly to the top. Upon its north-eastern slope is the water hole; this I find to be in solid rock, it is quite eight feet deep, ten yards long, and one yard wide, there are other pockets containing water in the neighborhood but they are very small. This water is so sheltered from the sun that I should imagine the dusky denizens of these regions would look upon it as a permanent water, but a team of really thirsty camels would make serious inroads with its contents. It would be difficult to get stock up to it, and the surest and safest way would be to carry it down to them. I noticed here many of the ant tunnels upon the ground, and secured several pieces of this tunnel work and a few of the builders; put them all into a tin box with the hope that they may prove of interest to any who value such specimens. I can only regret the loss of the jar of methylated spirits at Bond Springs, for many specimens of the insect kingdom could have been preserved during this journey. There is a large quantity of poison bush around the rock, but the camels, taught, I suppose, by experience, do not touch it. Bar. 28·360in., ther. 75° at 5 p.m.

Tuesday, June 18th.—Camp No. 49. Bar. 28·360in., ther. 36°.—Fine, bright, and clear. The camels separated into several mobs during the night and were not brought up till late. The water at this camp ceased to run during the night; had a longer stay been necessary I should have had to move round to the reservoir on the other side of the hill. Started away at 10·30 on a bearing of S. 68° W., for the first two miles travelled over mulga flats where there was a little rough grass growing, nor was there any spinifex, but this very soon set in. Travelled over flat sandy country with

occasional sandhills which continued until 5 o'clock, when I camped, the stoppages and delays were so many owing to the perversity of one camel saddle that only twelve miles were travelled. Bloods Range appears to be four or five miles distant, the highest point of which I have named Mt. Harris, after Mr. Charles Hope Harris of the Survey Department; a high point to the east of Mt. Harris, and only separated from it by a deep ravine, I have named Mt. Carruthers, after Mr. Carruthers of the Trigonometrical Survey Department, who is now engaged in an important survey of the Musgrave Ranges and whose labors we hope will soon extend to this point, and enable the intervening country to be accurately laid down. As seen from the sandstone rocks and native well at camp No. 30, a distance of seventy miles, Mt. Harris and Mt. Carruthers seem to be quite separate, having a narrow pass between them—and perhaps it would appear so if seen from the south. Bar. 28·280in., ther. 64°.

Wednesday, June 19th.—Camp No. 50; S. latitude 24° 37' 36". Bar. 28·350in., ther. 36°.—Bright, fine, cool. Started away from this camp at 8·30. The camels were tied up all night, for there was nothing for them to eat, but I hope to get good quarters for them at Blood's Range, although from this point there does not seem to be any watercourse on this side of it: the sandhills around here for a considerable distance have been burnt by the blacks, leading me to hope that some water discoveries may be made to-day. Travelled upon a bearing of S. 68° E. and in four miles reached the foot of the range. I was again doomed to meet with disappointment for no sign of water was to be seen anywhere, nothing worthy of the name of a water channel left the range, nor were there any places where water would lodge, the country at the foot of the range was nothing but spinifex and stones; having brought the camels close under the range it was a difficult matter to find a small space clear of stones for them to lay down upon while I made the ascent; this being at last found, Fred, Billy, and I made the ascent, leaving Beetson and Weei with the camels. It took us an hour to reach the summit, but the view from there well repaid our exertions. I recognised the familiar outline of Mt. Olga in the dim distance, bearing 121° 50', it must be at least seventy miles away; the east end of a low range bears 100° 30', the east end of the Petermann Range bears 147° 30' beyond which is a very distant peak (probably Stevenson's Peak). The most easterly end of a line of hills bears 322°, the western end 311° 30'. I have named this South's Range, after Mr. South, the warden of goldfields and superintendent of police at Alice Springs, to whom I am much indebted for obtaining for my service the black tracker, Billy from the ranks of the native police; a more willing, intelligent, industrious and skilful native it would be impossible to have. The Petermann Range appears as a long low range without any points of special interest; it appears to be not more than six miles away,

the intervening country being oak and spinifex sandhills, all showing evidence of having been recently burnt. This part of the range on the south side appears very precipitous without any sign of a creek from any point. I find by aneroid measurement that Mount Harris is 1,422ft. above the level of the plain. Descending from the hill we reached the camels at 1.20, having been occupied three hours. Having partaken of a light lunch, for which the climb gave us a very keen appetite, I stood away easterly for one and a half miles to get off the stones, and then turned S. 64° E. for three miles and then turned east to follow the foot of the range, hoping at every mile to meet with a watercourse. Kept on this bearing for four miles, travelling over level spinifex sandy country with occasional oaks. Arrived at the end of the range, where there was a small patch of bushes and feed for the camels and in a beautiful clump of oak timber, called a halt for the night. The outline of Mount Harris from this point is one of imposing grandeur, but my experience has now taught me that it is not to such features as these that the traveller in these regions must trust for assistance, far more reliable are the small rocks met with in the heavy sandhill country; these may be difficult to find, and are often found quite by accident, but I think at most of them the temporary requirements of a light party will be found in the small rock reservoirs and native wells, which seem to be the only form of water supply in this country. Bar. 28.200in., ther. 62° at 5 p.m.

Thursday, June 20th.—Camp No. 51, Pine Rocks. Bar. 28.325in., ther. 36°. Cold, S.E. wind.—Started on a bearing of N. 45° E. towards a low stony range, travelled over spinifex sandhills for three miles and then followed along the foot of the range upon a bearing of S. 80° E. for five miles. I was not in a position to start from here to Lake Amadeus for I thought it probable that some difficult country would have to be travelled over; the camels having had but very little feed and no water since leaving the rocks are not in good trim for such an undertaking. The little sandstone rocks were not many miles away and plainly visible, so I decided to give them a day there before starting for the lake, turned upon a bearing of N. 20° W. and in six miles reached the rock, forming a camp on the north side close to the reservoir. Bar. 28.550in., ther. 75° at 5 p.m.

Friday, June 21st.—Camps Nos. 48 and 51. Bar. 28.625in., ther. 36°. Fine cold east wind.—Took two photographic views of the north side of the rock. The reservoir is not to be seen in it. It lays about half way up the slope, and a little westerly of a white gum-tree marked $\frac{T}{6.59}$. The camels walked nearly up to the water, and it was carried down to them in buckets. Had they been really thirsty, this would have been a very tedious undertaking. It is most lovely weather, and this is a very pleasant camping place, the camels so well contented that they are never out of sight of the camp. From the reservoir this morning I noticed a range

bearing N. 74° E., that I had not observed before; either I had not noticed it, or from unfavorable conditions of the atmosphere it was not in sight, and as Mr. Giles' position of Mt. Unapproachable was not an observed one, it is quite possible this may be it. I shall take a course to-morrow a little south of this hill, which must take me to the lake. Bar. 28.600in., ther. 68° at 5 p.m.

Saturday, June 22nd.—Camp No. 52. Bar. 28.63in., ther., 42° . Light clouds, cold east wind.—Started away at 8.30 on a bearing of 90° . Passed through mulga scrub in broad sandy flats between sandhills, the spinifex not being so thick as we have been accustomed to lately. This soon gave out, and dwarf mallee was passed through. I noticed a few white gums on the sandhills at midday, and we soon entered into an undulating sandy country, which was quite a forest of those gum and oak trees, very pleasing indeed to the eye, calling to mind the forest country of many parts of Victoria, the waving stems of the spinifex being well taken for pasture. But there was no sign whatever of animal life, and, to make it still worse, it is a country evidently avoided by the blacks, for though we have not seen any during the whole journey we are quite sensible of their proximity at times; but no sign of a piece of burnt ground has been passed during the day. The sandhills in the afternoon were distressing to the camels and the spinifex seemed matted together. There is absolutely nothing whatever but this and the white gums, and after a long day's march it is hard to have to tie the camels up all night with neither food or water, but this has been their fate so very frequently upon their journey that they take it as a matter of course. Travelled twenty-one miles over such country that I wish never to meet again. Bar. 28.610in., ther. 56° at 5 p.m.

Sunday, June 23rd.—Camp No. 53; latitude $24^{\circ} 30' 43''$. Bar. 28.650in., ther. 36° .—The night was cold and I noticed a slight dew this morning. Started at 8.45 upon a bearing of 90° and soon came to a small salt pan; turned one mile N.E. to avoid this and continued on our course. At this point the sandhills became very much higher and running into each other in a confused and irregular manner and covered with white gums and oaks, at eight miles I ascended a high sandhill and observed an extensive tract of salt lake running easterly and westerly; this, however, appeared of no width, not exceeding a mile at its widest part, and as I wished to deal with its western extremity I turned the caravan in that direction. Upon the north side of the salt lake was a low line of hills of peculiar appearance, having either been recently burnt by the blacks, or else they are masses of bare red rock. I now turned N. 15° W., travelled over spinifex sandhills for one and a half miles and reached the shore of the lake, the width was only a few chains, but I noticed a long wide arm extending northerly towards the range. Travelled along the south shore for two miles west, which brought us to the west extremity of the lake, turned N. 25° W. one and a half miles, still keeping close to the lake, then

turned N. 53° E. and camped close to edge of what I think must be Lake Amadeus. Bar. 28·675in., ther. 61° at 5 p.m.

Monday, June 24th.—Camp No. 54. Bar. 28·680in., ther. 24° . —Upon rising this morning soon after dawn everything was white with frost, blankets hard and stiff, and a considerable thickness of ice in a tin dish that had been left out with some water in it; fortunately there was abundance of firewood, so we did not feel the cold so much as we should otherwise have done. Started away at 8·50 upon a bearing of N. 52° E. towards some bare looking rocks and a gap in the range that runs east and west, and whose western end may be said to mark the western extremity of Lake Amadeus, I have called it Long's Range, after my brother-in-law, Mr. John Long, of Richmond, New South Wales. In a direct line, this gap was about five miles from our last camp, but meeting with an arm of the lake that made me turn a little westerly, we did not reach the gap until I had travelled considerably more than that distance. A small water channel runs from the western end of the range into a long salt arm that extends to within a mile of the hills, and at the head of this arm, and upon each side of the creek, there is a nice piece of country well grassed with saltbush and cotton bush, and several clay pans, which were full of water. I find the range to be the same formation as the little rocks at Camp 48, their bare reddish appearance being caused partly through having been recently burnt by the blacks and partly from large masses of bare sandstone. No water was found, though I judge there must be a native watering place at the western end; but it was not our good fortune to find it. Ascending the highest point available, I was surprised to get no view of the lake. To the southward it appeared at two or three points, but only as a very narrow channel; to the north-east a group of low hills was observed, being not more than five miles distant; all the country in that direction seems to have been recently burnt. Mount Olga was distinctly visible, bearing S. 23° E., and Mount Harris S. 67° W.; a low, flat-topped hill bore S. 82° E., distant about twenty-five miles. Descending from the hill (which was of no great height), I continued along the foot of the range for three miles upon a bearing of N. 86° E., and then turned east for three miles. I was now anxious to meet with the lake, for near its shore was my only chance of obtaining food for the camels. Turned upon a bearing of S. 50° E. Travelled on spinifex and oak sandhills for five miles, and then turned south. In one mile I came upon a beautiful salt and cotton bush flat, and a little further on found some large deep claypans full of water. This was an opportunity not to be missed, and though it was still early in the afternoon (4·15) I had the animals unpacked, and they were soon hopped out upon the first pasture they have had upon this journey. They were all ready for water, and drank greedily. Bar. 28·680in., ther. 56° at 5 p.m.

Tuesday, June 25th.—Camp No. 55; S. latitude $24^{\circ} 35' 18''$, E. long. $130^{\circ} 31'$. Bar. 28·750in., ther. 26° . Keen east wind.—Started at 8·30 on a bearing of S. 60° E. After passing through a belt of dense mulga scrub we entered upon a saltbush plain, with good grass, now quite green. Numerous large claypans full of water sparkled in the bright morning sunlight. Near the claypans the ground was still soft from the rains, and in one or two places the camels got bogged. In these claypans both polygonum and cane grass were observed—not the tall vigorous variety met with in Riverina; but it was quite a new feature to us, accustomed for so long to nothing but the odious spinifex. Continued upon this bearing for eight miles, when we found ourselves at the head of an arm of the lake. I now turned towards the flat-topped hill seen from Long's Range. Travelled upon bearing of N. 76° E., and in six and a half miles reached the hill. From the top Mount Olga bears nearly south; the shore of the lake is about two miles off to the southward, cotton and salt bush country intervening. The lake here appears to be less than four miles across, and is seen stretching away to the south-east beyond the limits of vision. Upon Mr. Giles' map little hills such as these are shown; and, as he speaks of a saltbush country, the conviction is forced upon me that the west extremity of Long's Range is his Mount Unapproachable, and this is verified by the bearing of Mount Olga and from the fact that no signs of any hills or ranges are to be seen towards the south-east. Having satisfied myself upon those points, I decided to go no further to the eastward, but to return to the west end of the lake, traverse its south shore, and from there start to Mount Olga. Returned on my tracks for six miles, and camped upon an arm of the lake. Bar. 28·725in., ther. 77° at 5 p.m.

Wednesday, June 26th.—Camp No. 55; S. latitude $24^{\circ} 35' 18''$, variation $1^{\circ} 41'$ E. Bar. 28·715in., ther. 27° . Cold, frost, clear.—There being very excellent feed here for the camels, a day's rest for them is desirable, and I decided to remain here for their benefit and endeavored to sketch in a portion of the outline of the lake; but anything more irregular than its north shore line cannot well be drawn, and nothing but an actual traverse could delineate its numerous estuaries, bays, peninsulas, gulfs, and islands. Took a very careful circumferentor bearing to Mount Olga from this camp, and find it to be $174^{\circ} 30'$: and I am satisfied that I am east of Mount Unapproachable. It cannot be looked upon as otherwise than providential that Giles was prevented from reaching the west extremity of this lake; for when we reflect upon the character of the country that awaited him had he done so, instead of it taking him, as he anticipated, into a more fertile country, it would have been into difficulties that might have ended in disaster, perhaps death. At this point the oaks and spinifex come down to the edge of the lake, the opposite shore being at least three miles distant. Two wild dogs were observed upon the shore of the lake this morning. Bar. 28·625in., ther. 60° at 5 p.m.

Thursday, June 27th.—Camp No. 56. Bar. 28·600in., ther. 31°.—Returned upon my outgoing tracks for one mile. I then started upon a bearing of N. 80° W. In three miles reached a saltbush plain with claypans and grass. I obtained a good view of a portion of the lake, which is here two miles wide. Continued through oak forests with occasional clumps of white gum trees, the sandhills running irregularly, but not of any great height. There were some large patches of ground that the blacks had burnt, and upon these we travelled whenever opportunity offered, for it is an immense relief to the camels to be off the spinifex if only for a few yards. At nine miles the west extremity of Long's Range was observed, and to avoid meeting with the arms of the lake, that extend nearly to its foot, I turned upon a bearing of N. 65° W. for seven miles. At this point we came upon a flat saltbush country, with grass, mulga, and claypans. Turned N. 56° E. for three miles, and hit our outgoing tracks near the foot of Mount Unapproachable. It was noticed that the tracks of four blacks had our been on trail, but they only continued there a short distance. The last seen of their tracks they were evidently making for the hills. Camped at a claypan at the extreme western end of the lake. Bar. 28·525in., ther. 64° at 5 p.m.

Friday, June 28th.—Camp No. 57; S. latitude 24° 39' 16". Bar. 28·510in., ther. 46°.—The camels all drank well last night, and as there was abundance of feed for them they looked very well when brought up for duty. I intend to follow down the south shore of the lake to-day, so followed my tracks for three miles to the point where we first struck the lake, the camels marched grandly along upon the clear flat clean ground upon the shore of the lake. I then took up a course of S. 52° E., which I thought would allow of my continuing if not upon the shore at any rate within sight of it, with some few diversions to avoid certain inlets. This continued for eight miles. I was anxious to hug the lake as close as possible, for the spinifex sandhills to the south I could see were rather alarming. After rounding rather a deep inlet, I turned S. 42° E. I kept pretty nearly upon this course for five miles, but was continually being turned by the irregularities of the shore line, and once or twice the camels were bogged; so turned east, which course took me into very heavy sandhills, indeed—hills and hollows alike covered with white gum trees, quite a forest. Continued for four miles, and then turned north-east for the shore of the lake, which I reached in one mile. Followed down the lake for half a mile and camped, after a tedious heavy day's work for the camels. It is worthy of remark that while the north shore of this lake opens out into rather extensive flats of saltbush, cotton-bush, grass, claypans, and mulga, the south shore is bounded by high sandhills of the most forbidding character, entirely destitute of other grass than spinifex, and without any surface of clay, which, forming into shallow pools, would allow water to accumulate. The white gum

trees before alluded to appear healthy, but are not of such sort to be of much service for ordinary bush purposes. Bar. 28·455in., ther. 68° at 5 p.m.

Saturday, June 29th.—Camp No. 58. Bar. 28·575in., ther. 48°, cloudy, calm. — One of the camels (Darby) was brought up looking very bad, and my riding camel (Tooroo) looks anything but bright. It seems only too likely that they have eaten some poisonous herb. Darby has always been in trouble ever since we left the Peake, and though he is the largest camel of the lot he is by no means the strongest. Lately he has carried only about 150lbs. weight, and for the last two days he carried two empty casks. This day I am sure will be a severe one, but as there is neither food nor water for them here I must move them on with the hope that they may reach Mount Olga, where I have promised them a full week's rest. While they were being saddled up I took a walk down to the lake and ventured upon its surface. I should have said that water is only to be seen in a few places, even after the heavy rains of this winter. Its surface is white with a thin coating of salt, and I was surprised to find that for fully half a mile it was quite firm to walk upon, and I think, had it been desirable, that I could have walked to the opposite shore, not more than two miles distant. I found upon removing a few inches of yellow sand from the surface that I came upon fragments of gypsum. I imagine that salt springs would be found upon many parts of its surface, which alone account for any water that is occasionally seen upon it. Started away at 8·35 on a bearing of S. 10° E. for Mount Olga. My camel was so bad that I had to take a place in the rear of the caravan, so that having a track beaten down it would be easier for him. Billy now rode on ahead. He does not keep well on any course, but for the present I must let him go his own way. Travelled over high spinifex sandhills for five miles, when we were turned off our course by a salt pan of about a mile in length. The sandhills now were less severe, and the whitegum timber disappeared, its place being taken by occasional clumps of mulga and a few few oaks. Camped at 5 p.m. in open spinifex sandhills with but scanty feed for the camels. They were let go to make the best of it for two or three hours, but Darby returned to camp of his own accord and lay down, and my camel Tooroo laid down without attempting to go and feed. At 8 o'clock Fred and Billy collected all the others, and they were tied up for the night. Mount Olga from here presents a most wonderful appearance. Bar. 28·500in., ther. 58° at 5 p.m.

Sunday, June 30th —Camp No. 59. Bar. 28·575in., ther. 30°. — Let the camels go a little before daybreak. It was a bitterly cold night. From this camp a range that I take to be the McNicholl's Range of Giles bears S. 41° W., distant about six miles. At its eastern extremity is a large dome-shaped mass of bare red rock of most singular appearance. It is evidently a hill similar to Mount

Olga, and would well repay a visit. The scrubs look to be very thick around its base, but with two sick camels I think it best to push on to where I know there is good quarters where they may recruit. The dome-shaped rock at the end of McNicholl's Range I have named Mount Currie, after John Lang Currie, Esq., of Victoria. Started away at 8.20 upon a bearing of S. 17° E., Mount Olga being now in full view. Seen for the first time from any point this mountain must always strike the traveller as being a strange and wonderful object, and our wonder and amazement increases as it is approached. Travelled over spinifex sandhills for eleven miles, and then reached stony ground with mulga scrub and occasional patches of grass. Continued on until 4.30, the last few miles being over mulga flats splendidly grassed. This camp is situated two miles north of the Mount. The stony nature of the ground on ahead prompted me not to tax my weak camels too much, and there being very luxuriant feed for them here I camped, having travelled twenty-one miles. I took some views with the camera from this point, but the distance is too great for my small apparatus. The sick camels went away feeding directly they were let loose, but they evidently require some nursing. Bar. 28.300in., ther. 56° at 5 p.m.

Monday, July 1st.—Camp No. 60, Mount Olga. Bar. 28.325in., ther. 36°. Fine, clear. cold east wind.—Started at 8.50, and at one and a half miles was at the foot of this stupendous mass of bare rock, proceeding round its west extremity I passed a beautifully grassed flat, timbered with bloodwood and mulga. There was a stream of clear water running southwards for nearly a mile from the range; passed this, and in another mile reached Mr. Giles's camp under the abrupt wall of the mountain. Here was another beautiful stream of water, but as it was not so favorable a camping place as the first stream we crossed I returned, and the camels were soon let go upon the most luxuriant pasture; they did not move much during the day, and when tired of feeding they rolled about on it, and toward evening strolled off down the flat. Bar. 28.150in., ther. 54° at 5 p.m.

Tuesday, July 2nd.—Camp No. 60, Mount Olga. Bar. 28.310in., ther. 40°.—A very strong southerly wind sprang up during the night, and the morning was piercingly cold. Upon collecting the camels this morning the two invalids were missing. Billy went after them, and in about an hour he returned. They were most wretched looking objects. I cannot attribute their indisposition to any cause but poison, for the other camels are all extremely well, but the symptoms are different to those which were poisoned near Glen Edith. There is now a heaving of the flank and a difficulty of breathing, and each inspiration is followed by a wheezing noise, a very slight discharge from the nose, and they resolutely refuse the daintiest morsels of food offered them. My camel Tooroo seems the least affected of the two. Employed during the day

mapping, posting up diaries, repairing clothes and boots. Bar. 28·315in., ther. 48° at 5 p.m.

Wednesday, July 3rd.—Camp No. 60, Mount Olga. Bar. 28·325in., ther. 26° at sunrise.—It is doubtful if the two invalid camels will ever leave here. Darby has certainly eaten nothing since he arrived, and he is rapidly falling away in condition. I think the suggestion cannot be too often repeated, viz., that future travellers in these regions should be supplied with some simple remedies for these cases of vegetable poison. Tooroo has borne the full brunt and burden of the journey, for being always in advance he has had the roughest of travelling; he has carried me bravely throughout, and it is sad to see the noble creature stricken down and helpless. Every advantage has been given to the other one, for being always in the rear the camels in advance have made the way smooth for him. Our camp is situated at the entrance to a defile in the mountain, upon one side is a perpendicular wall of rock a quarter of a mile long; walking up this defile or gap it is found that walls of solid stone are upon each side, and all is stone underfoot, and along this pavement a little stream of water runs the whole length of the gorge. The whole mountain is a mass of coarse conglomerate, the stones varying in size from that of a pea up to 6in. in diameter, only in two or three instances were any found that would be termed a boulder. Of the many hundreds of stones examined during a long ramble not a fragment of quartz was observed.

Thursday, July 4th.—Camp No. 60, Mount Olga. Bar. 29·290in., ther. 48°, cloudy, cold.—All the camels were brought up but one. Darby has answered his last call and is now at rest. He appears to have died without any pain, for there is not any sign on the ground of a struggle. Tooroo is gradually becoming weaker, and rambles about unfettered by himself. I leave here on Monday. I may take him with me as far as Ayers' Rock, but he will most likely be left here, where there is such splendid pasture and water for him. The other camels are in splendid heart, racing after each other, kicking, and playing directly their hobbles were taken off. Desirous of knowing something of the wash that comes from this mountain I took a tin dish to the creek and panned off some of the drift. Not receiving any encouragement I tried further down the creek. Noticed a fine black sand in the bottom of the dish, which being tested proved to be as peculiar ore of iron. Bar. 28·225in., ther. 58° at 5 p.m.

Friday, July 5th.—Mount Olga. Bar. 28·280in., ther. 42°.—Had one man engaged prospecting down the creek. Engaged the greater part of the day with the camera. Bar. 28·180in., ther. 82° at 5 p.m.

Saturday, July 6th.—Mount Olga. Bar. 28·075in., ther. 30°.—Tooroo does not improve and looks a most pitiable object. My one regret is that I am unable to do anything for him. I went

down the creek prospecting, selecting a spot lower down the little water channel than where Fred worked yesterday. The others engaged in mending saddles and preparing for a start on Monday. Geological specimens Nos. 79 to 84 collected.

Sunday, July 7th.—Mount Olga. Bar. 28·100in., ther. 38°.—Beetson and Warman went for a ramble round the foot of the mount. Beetson returned with material for several sketches of the most striking points of interest. Noticed several blacks' fires close by, and I thought we should have had the pleasure of their company, but none came within sight. The little streamlet that here leaves the mountain runs over a stone pavement for 200 or 300 yards, shaded by the smooth and perpendicular cliffs. We imagine what a cool, clean retreat this must be from the blinding rays of the summer's sun—"The shadow of a great rock in a weary land." Being cold winter weather we seek the sunshine and watch for the sun's rays to reach us. As the great shadow is gradually withdrawn from the plain it reaches its base about 9 a.m. Went up the gorge to take some photographs, and in one or two small hollows was some crystal clear water about three or four inches deep. The bottoms of these little rock basins had all the appearance of the most exquisite mosaic work. The water rushing from the surrounding slopes in times of rain had forced out every particle of sand and foreign matter and left the many-colored conglomerate perfectly clean, and seen through the clear water was a most beautiful sight. Some years ago I attempted the ascent of this mountain and failed. I know the country around for over 100 miles. Its height is already determined (1,500ft.), and no object would be gained by attempting it again. To reach that point all that would be required would be a rocket and line to draw up a rope ladder, and then a mortal with sufficient nerve to make the ascent. It is quite evident that this place has not been visited by whites since Giles and I were here in 1874. I leave behind two camel packsaddles and four boxes, and being on stony ground and in perpetual shade they will remain there a long time without injury.

Monday, July 8th.—Camp No. 61. Bar. 28·050in., ther. 33°. Fine, bright, clear.—After having been to see Tooroo, I decided to leave here to-day. It is evident his recovery will take a very long time, for, in addition to his internal ailment, he is suffering from an injury to one of his hind legs. Upon this he was never strong, and I think that in one of the bogs at Lake Amadeus he must have again injured it. A more beautiful and luxuriant spot could not be found for him to recruit in, and I sincerely hope he may recover. Started easterly at 12·15, taking the south side of the range. Travelled over well-grassed mulga flats for five miles; at seven miles occasional patches of spinifex were passed over. Camped at 4·30, having travelled ten miles. Bar. 28·300in., ther. 74° at 5 p.m.

Tuesday, July 9th.—Camp No. 62. Bar. 28·300in., ther. 32°, calm, bright, and fine.—Started away at 8 a.m., Ayers Rock being five or six miles away. Travelled over sandy flats covered with mulga scrub, passing occasional spinifex sandhills, and soon reached the grass flats at the foot of the rock. Passed round the south base of this mountain of unbroken, unfractured stone. At 11·30 I unsaddled upon the spot where I camped fifteen years ago, when here with Giles. After dinner we went out to explore and admire this wonder in solid granite. Many and varied are the wonderful shapes it assumes. In one place the graceful curves and lines upon this vast expanse of rock resemble an enormous curtain turned into stone. In one or two places large caves are to be found near the foot, and these in a measure spoil the otherwise regular and graceful lines chiselled by nature upon its face. The rock formation is a coarse-grained grey granite, the surface all over bearing a reddish color from exposure to the elements, smooth as glass, and almost polished. It appears to me to be quite inaccessible, except at the one point where Mr. Gosse and his companions made the ascent. Bar. 28·375in., ther. 62° at 5 p.m.

Wednesday, July 10th.—Camp No. 62. Ayers' Rock. Bar. 28·555in., ther. 36°, a keen easterly wind.—To-day I made a diligent search for Mr. Gosse's marked tree, taking Billy with me. For two hours or more we wandered about, closely examining every tree. I remember it was an unusually large bloodwood, but its exact locality I could not recollect; but quite close to his camp I saw the charred stump of such a tree, and upon the ground was observed a long line of ash and charcoal, and it became evident beyond doubt that this was Mr. Gosse's tree. At the time of the fire there must have been a very high wind, for its destruction is most complete, not a twig or spray being left. Being such a large tree, it was probably in some part a little decayed, and this would accelerate the work of destruction. I was sorry for its loss, as it would have been interesting to have compared the overgrowth with that from Glen Edith. Bar. 28·430in., ther. 62° at 4 p.m. Rock specimens Nos. 85 to 88 collected.

Thursday, July 11th.—Camp No. 62, Ayers' Rock. Bar. 28·600in., ther. 48°.—Strong, variable, and very cold winds, cloudy. Took several photographic views of the Rock. Collecting specimens.

Friday, July 12th.—Camp No. 63. Bar. 28·600in., ther. 48°.—Cold easterly wind. Started away towards Mount Connor, on a bearing of 98°, at 9 a.m. Soon after starting one of the camels, "Moochar," went dead lame, had to slow down all day to give him a chance: it seems to be a contraction of the back sinews, he is a grand camel, and I trust he is not going to lay up; their loads now are very light indeed, so that cannot be the cause of it. Travelled fifteen miles. Bar. 28·55in., ther. 54° at 5 p.m.

Saturday July 13th.—Camp No. 64. Bar. 28·650in., ther. 45°.—Keen easterly winds. Started at 8·30. “Moochar” does not appear much better this morning. Made other arrangements for his benefit, and to-day he will only carry the little boy, Weei. Travelled upon the same bearing as yesterday, over spinifex sandhills, with broad firm flats between them, these were covered with mulga, and in some places were very scrubby with quantities of dead wood laying upon the ground, this made travelling difficult. It has been very cold to-day, too cold to ride. Many of us are almost barefooted, so walking is a luxury denied us. Several fresh tracks of blacks were passed this morning, and their fires were quite close to us. Camped at 4·30, having travelled twenty miles. Bar. 28·725in., ther. 50° at 5 p.m.

Sunday, July 14th.—Camp No. 65. Bar. 28·710in. ther. 29°.—A bitterly cold night, had to turn out several times to make up the fire, bedding all frozen hard. Started at 8·30, Mount Connor being in full view. Travelled over grass flats covered with dense mulga scrub, between these were spinifex sandhills; at noon reached a low sandstone ridge, covered with dense mulga, and is marked by a low abrupt cliff that stops the caravan approaching any nearer to Mount Connor. Followed up this low ridge in a northerly direction, and in five miles Billy, who was walking on ahead, cried out “water!” I think I never saw water in a more unlikely looking place, it was in a native well, at the foot of this cliff of fractured and riven sandstone; there are several native encampments in its vicinity, otherwise there are no indications whatever. I decided to take advantage of this discovery, so had the camels turned out while I ascended the little ridge to view the surroundings. I find that this little spring is about half a mile from the most easterly end of this low ridge, and about a mile and a half north of Mount Connor. I notice an attractive range about thirty miles distant, its outline and general appearance being very similar to Gill’s Range. Its western extremity bears N. 8° E.; its eastern end N. 22° E. A salt lake formation bears N. 15° E. This may possibly be the eastern extremity of Lake Amadeus; another salt channel bears 3°. I intended to have travelled easterly from here towards the Goyder Springs, but this range, with a lake apparently close to it, has altered my plans. I shall visit these features, for neither are marked upon any plans that I have. The peaks of the Musgrave Ranges appear so temptingly close, and I should much like to go down there before going to Erldunda, but while there are new features to discover I must deny myself the pleasure. Bar. 28·680in., ther. 46° at 5 p.m.

Monday, July 15th.—Camp No. 65; S. lat. 25° 26′ 55″. Bar. 28·650in., ther. 32°.—Cold easterly wind, with frost. I had to get up several times during the night, owing to the extreme cold. At 2 a.m. the thermometer went down to 29°. The camels wandered

away during the night, and were not brought up till midday. I noticed large flocks of *marientis* flying about overhead; decided to remain here the rest of the day. Bar. 28·580., ther. 62° at 5 p.m.

Tuesday, July 16th.—Camp No. 66. Bar. 28·575in., ther. 32°, cold east wind.—The camels seem to quite dislike this place. They rambled away again last night and were not brought up till midday. Started away at 1 p.m. upon a bearing of N. 15° E; travelled over spinifex sandhills with mulga scrub between them. Native poplars were noticed on the sandhills; this class of country continued for eight miles, when the sandhills fell off and we entered upon firm flats with nodules of limestone with dwarf acacias and saltbush. In another mile reached the south-east end of a small salt lake. Here I fixed the camp for the night, there being splendid feed for the camels. Travelled ten miles. Bar. 28·700in., ther. 56° at 5 p.m.

Wednesday, July 17th.—Camp No. 67; S. latitude 25° 5' 40". Bar. 28·750, ther. 26°.—We had but a slender supply of firewood last night. At dawn the boxes, bedding, pillows, &c., were white with frost. At present the bed of this lake is covered with salt water, and, sparkling in the bright sunshine, looks quite attractive. Started away at 8·50. Rounded the lake in two miles upon a bearing of N. 40° E. Then turned N. 14° E., which taking us away from the little lake soon brought us into spinifex sandhills. Kept on this bearing for two miles, and then turned N. 8° E. towards a gap in the range I was steering for. Soon after starting on this bearing struck the south-west arm of a salt channel about half a mile wide and five miles long. Two miles further on struck the south end of another salt lake which had water in it. Travelled upon the east shore for three miles. Here the travelling was flat and free from spinifex, and was a great relief to the camels. Upon reaching the north end I expected that we should enter into spinifex sandhills again, but was agreeably surprised to find a country covered with dwarf acacias and leguminosæ. The surface was strewn with nodules of limestone, and for the first time upon the journey a bluebush was seen. I noticed also a dwarf pittosporum that I had seen on the south shore of Lake Amadeus. The country continued of this description for four miles. We then entered in a level country with mulga scrubs and the usual coarse tussock grass. This, however, was now quite green. Perhaps to celebrate our advent this very dreary-looking country was attired in its best, but I think these dense mulga scrubs are particularly dreary and monotonous travelling, more especially so when the unknown feature for which you are steering loses that attractive appearance that it had a few miles further back, and as each succeeding mile brings you closer it becomes more certain that you will meet with disappointment and accumulating difficulties. At thirteen miles from our last camp I turned N. 45° E. to examine a place where I thought I observed a difference in the timber, and in two miles approached a stony water channel in which were growing a few

very stunted gumtrees. I followed this up towards the range for a mile, and then came to some small pools of very beautifully clear water. The range for which I had been steering was about two miles ahead of us, and did not look by any means inviting, stony and fringed with a belt of dense mulga scrub. I could not see any place where water would be likely to accumulate. Of course the water where our camp is situated is only from recent rains, and will not last much more than a week. Bar. 28·550in., ther. 56° at 4 p.m.

Thursday, July 18th.—Camp No. 68; S. lat. 25° 5' 40". Bar. 28·525in., ther. 32°.—A central point of Mount Connor bears 200° 35' from this camp, but as it presents only an extensive flat surface I should say that is the bearing of its centre. Started at 8·30 on a bearing of N. 40° W. towards the western end of the range, thence west for two miles; I was now at the western extremity of the range, having travelled over stony slopes and through dense mulga since leaving camp. I now turned northerly for two miles over the same class of country. Before turning easterly I ascended a slope of the range and observed low hills to the west, about four miles distant south-westerly, and, separated from these by a small gap, is another line of hills; to the northward were spinifex sand-hills. I now turned upon a bearing of S. 84° E. to traverse the northern slopes of the range; travelled through dense mulga scrub for four miles and then turned S. 76° E., in five miles upon this bearing reached the eastern end of the range. No watercourse will be found to run from either the north or south slopes of this range; it does not appear to be much frequented by the blacks, nor do I think any water exists there. Directly I left the range the country improved, and at sundown I turned the camels out upon a grassy mulga flat where was the most luxuriant herbage for them. Travelled eighteen miles, being much delayed owing to the difficult nature of the ground. I have named this the "Kernot Range," after Professor Kernot, of the Melbourne University, and the highest point at its western extremity, Mount Thompson, after the Hon. H. M. Thompson, of Victoria. Bar. 28·550in., ther. 57° at 5 p.m.

Friday, July 19th.—Camp No. 69. S. Lat. 25° 5' 40". Bar. 28·455in., ther. 32°.—Started on a bearing of 96°, passed over flat firm mulga country, occasionally coming to little hollows where the new growth of herbage was very luxuriant; in three miles turned our bearing of 92°, at this point two low isolated hills bore north, distant about three miles; here we came across a claypan with water in it, the blacks have placed boughs round one end of it to entrap emus. I noticed splendid cotton bush growing at this spot, the first seen since leaving the settlements. I found this ridge to be composed entirely of sandstone laying horizontally; after three miles of very rough stony hill travelling, and were again upon a flat well-grassed country. At fifteen miles from the last camp

turned upon a bearing of 98° , this just took us clear of the east end of a line of low hills also composed of white sandstone, the outer surface of which is reddened by exposure and consequent decomposition. At sixteen miles from last camp resumed on a bearing of 96° and travelled over a country that was entirely new to us. For months we have been accustomed to nothing but sandhills and spinifex, here we had an open flat, firm surface, nicely timbered with mulga and ironwood, and clothed with saltbush, cotton-bush, and bluebush, but there was not so much grass as I should have liked to have seen; kangaroo and emu were seen occasionally, this class of country appears to extend for a considerable distance to the southward. A range of hills of about 800 feet elevation lay about two miles to northward of our line of march and appeared to extend a considerable distance to the eastward. I hoped to have intersected some creeks running to the southwards from it, but none were met with. At 4 p.m. I reached a low limestone knoll from which I obtained an extensive view to the south and south-west; to the eastwards isolated lowhills, such as this I am now on, were dotted here and there leading me to infer that in that direction I may soon come upon a table land country. At 4.30, meeting with an exceptionally rich patch of herbage and bush for the camels, I turned out, having travelled twenty-four miles. Mount Connor is rather indistinctly seen from this camp, bearing $235^{\circ} 10'$. I have named this the "Basedow Range," after F. Basedow, Esq., M.P., of Adelaide. Bar. 28.410in., ther. 58° at 5 p.m.

Saturday, July 20th.—Camp No. 70; latitude $25^{\circ} 6' 35''$. Bar. 28.430, ther. 39° .—The camels looked very well indeed this morning. Started away upon a bearing of N. 44° E. at 8.45. I adopted this course that I might examine a favorable-looking part of the range, and soon after leaving camp passed some black gunyahs, where they had been camping in time of rain, a claypan being near at hand that had supplied their requirements. Passed over a few low stony hills, well clothed with grass, saltbush, and bluebush, and in two and a half miles reached the foot of the Basedow Range. I find it composed of a white sandstone, the surface of which had become of a brown color owing to exposure. It is covered with mulga scrub. From its summit the view to the northward appears to be one of saltbush and cotton-bush country, flat, and timbered with mulga. The horizon, however, is not a very distant one, which leads me to suppose that probably a sandhill country will be met with in that direction. Descending from the hill I travelled upon a bearing of 94° . Passed over very splendid pasture country until midday, and then turned the camels out, as I had numerous camp duties to attend to. The weather was delightful and the surroundings most charming. Bar. 28.550in., ther. 61° at 5 p.m.

Sunday, July 21st.—Camp No. 71. Bar. 28.740in., ther. 52° .—Started at 8.30 S. 60° E., towards a waterhole that Billy discovered yesterday while out kangaroo hunting. Passed over cotton

and saltbush plains for three miles, when we reached a very extensive cotton-bush plain that extended to the foot of the Basedow Range, about four miles distant. Here Billy took us to a number of claypans, a few of which contained water. After filling up the kegs I started again, upon a bearing of 94° . Passed over good pastoral country for three miles, and then turned one mile southerly to examine a clump of box timber. Here was a small and very shallow waterhole, but it was dry. Numerous kangaroo were about, and two turkeys were seen, and numerous crows. Resumed our course of 94° . At nine miles I was not very well pleased to meet with spinifex sandhills again. At nineteen miles I obtained an extensive view of the horizon to the south and south-east. This tract of sandhill country appears to come from the northward between the eastern end of the Basedow Range and the western end of a range that I take to be the Erldunda Range, and it does not appear to extend far to the southwards, for I can observe low flat-topped hills and an apparently open country in that direction. Camped at dusk in spinifex sandhills with a range of sandhills bearing $N. 55^{\circ} E.$ from us and distant about six or seven miles. There being no feed here, the camels were tied up for the night. Travelled twenty-five miles. Bar. 28.800in., ther. 60° at 5 p.m.

Monday, July 22nd.—Camp No. 72, Erldunda Station. Bar. 28.845in., ther. 25° .—Started away upon a bearing of $S. 76^{\circ} E.$, at 8.45. Owing to a slight change of country near the camp I was under the impression that I was out of the spinifex sandhills, but I was soon convinced to the contrary, although the sandhills had occasional flats of firm ground between them which were looking fresh and green with grass and herbage. I continued in country of this character for eight miles, when Billy called out that he had seen an old horse track. At mid-day I came across two old dray tracks. Calling Billy up to consult him, he decided that they were the station drays carting in posts, and he said the station was close by. The sandhills now became farther apart, and the intervening country being better grassed, with occasional clumps of box timber. Horse tracks became quite numerous, and of recent date. At sixteen miles the station buildings were in sight, and soon after we arrived and received a most cordial welcome from Mr. Tomlin. Mr. Warburton was away on the run, but he arrived in the evening, and entertained us with a kindly welcome and the warmest congratulations upon our safe arrival. The evening was devoted on the one hand to questions as to what had been going on in the world, and on the other by relating the leading incidents of our journey, which, as a brother explorer, Mr. Warburton could thoroughly understand and realize. Travelled sixteen miles.

Tuesday, July 23rd.—Camp No. 72, Erldunda Station; S. latitude $25^{\circ} 12' 57''$.—I learn from Mr. Warburton that the most prominent point in the Erldunda Range is called Ippia by the blacks, and

that the highest point in the Basedow Range is known as Mount Ebenezer, having been so named in memory of the late Mr. E. Flint, of the Alice Springs telegraph station. The Basedow Range is easily seen from any of the sandhills near the Goyder Springs, though they seem never to have been visited. This group of springs lay south-westerly from here, distant about twenty-five miles.

Friday, August 2nd.—Camp No. 73.—After a stay of ten days at Erldunda we prepared to take leave of Messrs. Warburton and Conway, who have shown us every possible attention and kindness during our stay, but before leaving it may not be out of place to offer a few remarks upon the short history of this very distant station. Erldunda Spring was discovered by Mr. Warburton about five years ago, and was but a small native well at which one horse could barely find a sufficiency. By the industry and untiring energy of these two gentlemen this was soon opened out and the supply of water at some seven or eight feet was found to be practically unlimited. A double length of magnificent troughing was accurately and substantially laid down and the run stocked. As time, opportunity, and circumstances offered buildings and yards were erected and a horse paddock a mile square securely fenced. There is now a compact, substantial, and most comfortable homestead. As illustrating the capabilities of the spring I may say that during my stay there I saw 400 head of cattle watered there in half an hour. A year ago the station was attacked by blacks, and Messrs. Warburton and Park had a narrow escape from the shower of spears that were thrown in the short, sharp skirmish. During my stay reports were brought in by friendly blacks that a large body of blacks were collecting at the Goyder Springs intending to make another attack upon the place, and there was a feeling of insecurity and uneasiness that the pioneer settler is only too often subject to. At midday, everything being in readiness, we started away, taking the track that for some few miles goes towards the Goyder Springs. Travelled over sandy country for eight or nine miles upon a bearing of S. 66° W., and then the dray track was lost. We now turned upon a bearing of S. 66° W., and entered upon an extensive salt and cotton bush plain, where we camped. The herbage and grass were most luxuriant, the evening air being laden with the delicate perfume of many wild flowers around. Travelled thirteen miles. As we were unloading the camels a herd of cattle that had been to the Goyder Springs passed us and camped a mile or so to the N.E. of us, being on their way to Erldunda. For the first time upon this journey noticed the beautiful *Clanthus Dampieri* (Sturt pea) in bloom. Bar. 28·875in., ther. 56° at 5 p.m.

Saturday, August 3rd.—Camp No. 74 ; S. lat. 25° 28' 59". Bar. 28·850in., ther. 16°.—As will be seen by the thermometer, this was by far the coldest night that we have experienced. Started

away at 7-50, Billy volunteers to act as guide, being now in the country that is known to him. He seems to think this to be his post by every possible right of precedence, and as he promises to go straight I allow him to do so, though I would have preferred taking up the course myself. Billy did not go straight or anything like it, but the outcome of all his eccentricities, when plotted up, resulted in a general bearing of S. 40° W. for five miles, S. 36° W. four miles. Here we reached a long narrow salt lagoon trending east and west; near here was a claypan at which I replenished the kegs, albeit the water was very sufficiently yellow and thick. Continuing westerly for three miles, we reached the west extremity of the salt lake; following this down for half an hour and then came to a gully, down which in times of rain water would run from the adjacent sandhills into the lake. Some two or three chains away from the lake and up this gully was a small hole surrounded by rushes and shaded by a small acacia bush. This was the spring, evidently a very good one; the water is of most excellent quality, and it simply requires deepening to water any quantity of stock. From this spring we travelled S. 58° W. for two miles and arrived at Koolida Spring. Here are four or five mound springs with tall reeds round them; they are situated upon the south-western end of a small salt lagoon. The springs are choked up with black mud and reeds, but a small stream of beautiful water runs from them into the lake. Continuing upon a course of S. 30° W., we reached the Elinburra Springs in one and a half miles, the most southerly spring of the Goyder group and by far the best of them all. Like all the rest, it is situated at the edge of a salt lagoon, and three strong streams of beautiful water run into the lake. The adjacent country is of an undulating character and to the southward is especially well grassed. From a low limestone hill a few hundred yards westerly from the spring I expected to have been able to take a bearing to Mount Connor, but was disappointed, no hills being in sight but the Basedow and Erldunda Ranges, the former bearing $321^{\circ} 10'$, and the latter $20^{\circ} 50'$. Travelled sixteen miles. Bar. 28.650in., ther. 64° at 5 p.m.

Sunday, August 4th.—Camp No. 75; S. lat. $25^{\circ} 36' 46''$. Bar. 28.600in., ther. 22° .—Started at 9 on a bearing of S. $65^{\circ} 30'$ E. I was not by any means well, and I availed myself of Billy's knowledge of the country to travel in the lead and keep the course while I took a place in the rear, where the travelling is much easier than in the lead, there being actually nothing to do but sit still and be carried along. For five or six miles travelled over really very splendid and well-grassed country; limestone rises occasionally appeared and these were well clothed with saltbush and bluebush. Mulga scrub and a poorer class of country then set in; at eleven miles entered into a settled sandy mulga scrub country with occasional sandhills. From one of these I observed a low range of hills bearing S. 9° E., distant about twenty-five miles;

this is possibly Ayers' Range. Billy, who is now in his native land, tells me there are "many pretty places there," and that there is a trig. station on one of the hills. Continued on until 4.30, having travelled twenty-one miles, for the most part through flat mulga scrub country with coarse grass. Billy also tells me that we shall not meet with any more spinifex, which is indeed joyful news. Bar. 28.400in., ther. 68° at 5 p.m.

Monday, August 5th.—Camp No. 76. Bar. 29.310in., ther. 42°.—Last night was mild and pleasant, a most agreeable change from the biting frosts that we have experienced of late. Started upon a bearing of S. 68° E. After travelling for six miles through dense, though exceedingly well-grassed mulga scrubs, we emerged into more open country, rich in every variety of pasture. From the top of a low sandstone ridge that was here met with I obtained a more extensive view of the eastern horizon than I have had for a long time. North-easterly is a line of hills of considerable height, though apparently of no great extent. Upon abearing of S. 55° E. I observe some masses of bare red rock, apparently granite, and I decided to visit them with the hope of finding some feature of value and interest; travelled over flat, well-clothed pastoral country, which is now looking its very best. Bright flowers blossom all around; their varied hues and delicate tints present a brilliant and ever-varying panorama of splendour. It was a scene specially attractive to us, so long accustomed to the sombre and irritating spinifex. In six miles we were close to the rocks, and here the growth of grass, crowfoot, and other plants was most luxuriant; eclipsing all by the brilliance of their blossom was the vetch, a pea so plentiful in the Musgrave Ranges, and which here grows in large patches of an acre or two. In color the flower is a bright carmine, and forms quite a feature in the appearance of the landscape. The camels while walking on them snatch up huge mouthfuls as opportunities offer. Arriving at the rocks I found many traces of blacks, but no water. Turned south for half a mile to examine another mass of bare granite. Before I had time to get near it Billy, who was on ahead on foot, had found all there was to find, and that was a fair-sized rock hole containing sufficient for our night's requirements, and to replenish the kegs. The camels have been tied up every night since leaving Erldunda, and were entitled to a little consideration, so they were let go upon such feed that it has never been their lot to graze upon since we have had them. Camped at 3.35, having travelled eighteen miles. Bar. 28.160in., ther. 73° at 5 p.m.

Tuesday, August 6th.—Camp No. 77. Bar. 28.175in., ther. 48°.—Started at 7.45 on a bearing of S. 83° E. Travelled over well-grassed flat mulga country for five miles, then turned S. 65° E.; and in nine miles upon this bearing struck a small water course with a few gumtrees on its banks. I noticed that there was a quantity of soda on the sand in the creek channel, which led me

to think some water might be in the neighborhood. I therefore called a halt for half an hour so that a search might be made. Beetson and myself decided to go up the creek; Fred and Billy went in the opposite direction. We soon heard Billy calling out, and we returned to a spot only a few yards down the creek from where we crossed it, and there was a group of four or five native wells or springs in the creek. Surrounded as they are by very splendid pastoral country, this position will some day be of value. From here I turned upon a bearing of S. 30° E., and in four miles struck a large gum creek flowing to the southwards. The bed was level and sandy, and there being so little drift it was not easy to decide which way the water flowed. I imagine this must be the Krichauff of Mr. Giles's journey in 1873. In less than two miles crossed another and still larger creek, which I imagine would flow into the other. At the first creek I turned upon a bearing of S. 56° E., and continued travelling over flat, well-grassed mulga country till 5 o'clock, when I camped. Travelled twenty-four miles. Bar. 28.400in., ther. 75° at 5 p.m.

Wednesday, August 7th.—Camp No. 78; S. latitude $25^{\circ} 57' 42''$. Bar. 28.450in., ther. 23° ; cloudy, calm.—While Fred and Billy were out after the camels they noticed tolerably fresh camel tracks and a man driving them on foot. I imagine they must belong to a survey party. Started upon a bearing of S. 82° E., and very soon after noticed a trig. station upon a low scrubby hill, and in five miles reached its foot. Here it may not be out of place to express the hope that ere long this valuable work may be extended, and that these beacons, emblems of accuracy and precision, will be seen upon the mountain tops to the 129 meridian, and this vast territory accurately placed upon our maps. I regret not having gone up to examine the trig. to compare with my latitude of last night, but it was so early in the day that I was anxious to push on. Passed on the south side of the trig. hill, between it and some isolated rocks or ridges, a little southerly from it. We now entered upon a tableland country, well clothed with every variety of herbage. At nine miles from last night's encampment reached a small sandy channel running to the southward, in which was a strong water soakage. Billy tells me it is called Imbunyerra, and that he has been here before. To avoid certain rough-looking hills I turned upon a bearing of S. 60° E. Travelled for five miles over very rough hilly country, which gave us much trouble and caused many delays. At last found a leading channel, down which we travelled for two miles on a general bearing of S. 45° E. In the sandy channel of a small creek Billy found some water, and though it was still early I turned out, for the camels want water. Travelled sixteen miles. Bar. 28.475in., ther. 75° at 5 p.m.

Thursday, August 8th.—Camp No. 79. Bar. 28.475in., ther. 36.—I found such a multitude of duties requiring immediate attention that a start was not made till noon. Started upon a bearing

of S. 55° E., which just took us clear of some low bluff hills. In three miles turned S. 65° E., and at once entered into the thickest mulga scrub that I have ever met with. This, with the stony nature of the ground, made progress slow. Occasionally from a higher point a peep would be obtained of the country to the north and southward, but as far as the eye can reach it appears the same. Appearances are not more deceiving in anything than in judging of country from a distance. The only real way to find out what it is like is by going to see. At 4.30 I reached a small flat, which was traversed by a small sandy channel. Upon either bank, growing in the wildest luxuriance, was the most beautiful herbage, and as there seemed to be more stones and scrub on ahead I accepted it for the night's bivouac. Travelled fourteen miles. Bar. 28.600in., ther. 69° at 5 p.m.

Friday, August 9th.—Camp No. 80. Bar. 28.725in., ther. 35°.—A very lovely morning. Started at 7.30 on a bearing of S. 60° E. At eight miles turned S. 50° E., and in eleven miles from last camp struck a sandy water channel, down which at times tremendous bodies of water must flow with great violence. Evidence of such is to be seen in the scooped-out earth and sand, the bended and broken trees, the piled-up driftwood and *debris*. This channel apparently comes a great distance from the westward, and we having travelled from that direction and not having seen any hills 200ft. high I cannot but wonder where the great fall can be that gives the water so fierce an impetus. This little mulga channel soon swelled out into a broad sandy creek bed, in which were several little pools of water. Some few gumtrees also appear as we follow it down, but these though nearly all young are not of very vigorous growth. Continuing down the creek on a bearing of S. 80° E. for three or four miles it is joined by another creek coming from the northward. From the junction it takes a more southerly course. I now left the creek and stood upon a bearing of S. 45° E., travelling over stony, scrubby, undulating country for five miles, and to avoid some awkward-looking, scrubby hills I turned on a bearing of 90° and in three miles reached a small hollow where there was a little feed for the camels, which they were turned out upon for an hour or two, and then made fast for the night. Travelled twenty-two miles, for the most part over poor and scrubby country. Bar. 29.125in., ther. 62° at 5 p.m.

Saturday, August 10th.—Camp No. 81. Bar. 29.175in., ther. 24°.—Calm, bright, beautiful morning. Started away at 7.30 on a bearing of N. 10° E. over stony, scrubby hills. At six miles the country opened out into a wide valley, through which ran a small boxtree watercourse. In this a few small pools of water were noticed. Horse and cattle tracks now became quite numerous, showing that we were again approaching the settlements. At nine miles struck a cattle path that took us upon a general bearing of N. 80° E. At seventeen miles from our last camp a hut and cattle

yards were observed about a mile south of our course. Here I turned S. 45° E. to a myall water channel, in which were several large pools of water. The country now became more stony, and but for the cattle path being so well trodden and cleared of stones our progress would have been much slower. At 5 p.m. observed the buildings of Eringa station, and knowing that camels are often a cause of annoyance where there are horses I camped just in sight of the place. There was no feed for the camels, and though they have had an extra long day I was compelled to tie them up for the night. Travelled twenty-four miles. Bar. 29·500in., ther. 58° at 5 p.m.

Sunday, August 11th.—Camp No. 81, Eringa Station.—Went up to the station, and there had the pleasure of meeting Mr. T. Magarey, the manager of Crown Point Station, on the Finke. Later in the day I was introduced to Mr. Treloar, the manager, who offered us a most kindly and hospitable welcome, and sent down to our camp some of the produce of his garden in the shape of some of the finest cauliflowers that I have ever seen. Later in the day Mr. Treloar showed me round the garden, where I saw cabbages, turnips, and many other vegetables of splendid growth. We then went for a row upon the water, which is over a mile long and 30ft. deep. Four thousand head of cattle, besides a number of horses, find water here; and this is only one of many fine sheets of water on this run. Mr. Magarey started away for the Charlotte Waters telegraph station; and the following day Mr. Gillen, the telegraph master, sent out a special camel messenger with a note saying that the rations that should have been at Erldunda were lying there. My intention was to have travelled down the Stevenson Creek until I reached the telegraph line at the Macumba Creek; but this intelligence decided me to journey to the Charlotte, and there place myself in communication with the directors of the association.

Wednesday, August 14th.—Started away from Eringa Station at 11 a.m., and travelled along the road towards the Charlotte. The camels, finding themselves once more upon a well-beaten road, stepped out with a will. Travelled over the well-known stony tableland country, now looking very fresh and green, and camped at a myall watercourse. Travelled fourteen miles.

Thursday, August 15th.—Bar. 29·500in., ther. 33°.—Started at 7·15, and at twelve miles reached the Charlotte Waters telegraph station, when we received a most cordial welcome from Messrs. Gillen and Byron. Sent a message to the secretary of the association acquainting him of my arrival, asking for instructions as to my future movements. Took the camels a little way down the creek and there formed a camp, awaiting dispatches; which arriving in a few days, I directed the caravan down the telegraph line towards the terminus of the railway.

[Copy.]

Government Geologist's Office, Adelaide,
November 30th, 1889.

Sir—In accordance with your instructions, I have examined the specimens of rocks and minerals brought by Mr. Tietkens from Western Central Australia.

The specimens from Mount Sonder indicate the occurrence of ferruginous veinstones in clay slates and quartzites, and show that there is a probability of the occurrence of metallic minerals, including gold. The same may be said of Mount Rennie, Laura Vale, Mount Leisler, Bonython Range, and Basedow Range.

The remainder of the specimens, with the exception of those from Mount Olga and Ayers' Rock, which are isolated hills, are chiefly from tertiary and secondary formations, and the country represented by them is not likely to contain metallic minerals.

The whole collection is valuable as giving a good idea of the geology of a part of the interior which hitherto was unknown.

I have, &c.,

H. Y. L. BROWN, Government Geologist.

The Hon. Commissioner Crown Lands, &c., &c., Adelaide.

APPENDICES.

LIST OF PLANTS COLLECTED DURING MR. TIETKENS' EXPEDITION INTO CENTRAL AUSTRALIA, 1889.

By Baron Sir F. von MUELLER, F.R.S., &c., and Professor R. TATE, F.L.S., &c.

[From the transactions of the Royal Society of South Australia, 1890.]

[Read April 1st, 1890.]

Last year Mr. Tietkens was placed in charge of a party by the Central Australian Exploring and Prospecting Company, Adelaide, to explore the Macdonnell Range and the country to the west and south of it. The period of exploration embraced the months of April to August, and the plants which form the subject of this report were collected by Mr. Tietkens and his assistants during that time.

As Mr. Tietkens' map and journal are not yet published, the approximate position of each locality referred to in this report here follows:—

Proceeding northward from Charlotte Waters the localities are:—

Crown Point, on the River Finke, about forty miles north of Charlotte Waters. Horse-shoe Bend, twenty miles north of Crown Point. Orrorra, forty miles south of Alice Springs. Emily Gap (in the Macdonnell Range), eight miles south of Alice Springs. Burt Plain or the tableland on the north of the Macdonnell Range, the scarped front of which constitutes that range. (See East, Trans. Roy. Soc. S. Aust., vol. xii., p. 47, 1889.) Bond Springs, ten miles north-east of Alice Springs. Painta Springs, fifteen miles north-west of Alice Springs.

Thence along the Macdonnell Range are:—Mount Sonder, long. $132^{\circ} 20'$, lat. $23^{\circ} 35'$; Mareena Bluff, Mount Razorback, Glens Helen and Farewell being adjacent thereto. Glen Edith, long. $131^{\circ} 10'$, lat. $23^{\circ} 50'$.

Thence about west to the boundary line with West Australia. Watson Hills, about midway between Glen Edith and Gill's Creek, in Clelands Hills, long. $130^{\circ} 30'$, lat. $23^{\circ} 48'$. "Sandstone Rocks," long. $129^{\circ} 35'$, lat. $23^{\circ} 50'$. Laura Vale, six miles from Mount Rennie, in long. $129^{\circ} 15'$, lat. $23^{\circ} 35'$. Mount Leisler, in the Kintore Range, long. $128^{\circ} 25'$, lat. $23^{\circ} 30'$, sixteen miles from north-east of Lake Macdonald.

Lake Macdonald—Thence returning by way of Lake Amadeus to near Charlotte Waters, there are:—Warman Rocks, south-east of Lake Macdonald, long. $128^{\circ} 54'$, lat. $23^{\circ} 55'$. Mount Harris, in Blood's Range, long. $129^{\circ} 27'$, lat. $24^{\circ} 40'$. Mount Olga is seventeen miles north of west from Ayers' Rock, which latter is in long. $130^{\circ} 50'$, lat. $25^{\circ} 30'$; Mount Conner, long. $131^{\circ} 30'$, lat. $25^{\circ} 30'$. These island-like elevations are situated about half a degree to the south of Lake Amadeus. Basedow Range, long. $132^{\circ} 10'$, lat. $25^{\circ} 5'$. Between here and Charlotte Waters are Erldunda, Goyder's Springs, Ayers' Range, and Eringa, the last thirty miles west of Charlotte Waters.

The collection numbers 250 species, and compares not unfavorably with the joint results of Giles and Gosse in their several expeditions to this region. Nevertheless, the whole collection is somewhat disappointing, and adds but scantily to the records of the Australian flora. This is all the more to be regretted as the season of 1889 was exceptionally favorable, and the part of the region traversed was a novel one for botanical research. Much of the material has

been gathered without due discrimination as to flower and fruit, and consequently much time has been lost in the determination of the species, otherwise we might have had a much larger array of species.

The collection is characteristic of the Eremian region, and the high land of the Macdonnell Range does not seem to possess any other type of vegetation, though it offers several specific differences, and some few generic, as compared with the low-level tracts which stretch southward from its base.

The following species are new to the Australian flora:—*Eriostemon argyreus*, n. sp.; *Sida podopetala*, n. sp.; *Calotis latiuscula*, n. sp.; *Goodenia fascicularis*, n. sp.; *Ipomea racemigera*, n. sp.; *Teucrium grandiusculum*, n. sp.; *Eremophila Tietkensii*, n. sp.; and *Eriocaulon graphitimum*, n. sp.

The following species are additional records to the flora of extra-tropical South Australia*:—*Hybanthus miniatus*, F. v. M. *Phyllanthus minutiflorus*, F. v. M. Extends from Port Darwin to the Upper Victoria river.

Trema cannabina, Lour. An Oriental species, reaching as far south as N.W. Victoria; this adds a new genus to the flora.

Crotalaria incana, Linne. An exotic of tropical and subtropical distribution; is known throughout the northern half of this continent.

Acacia Bynoeana, Benth. Is known from the coast region of N.A.

Acacia acradenia, F. v. M. Inhabits the dry zone from Nickol Bay to the head waters of the Victoria river.

Acacia patens, F. v. M. Same distribution as the last.

Erechthites lacerata, F. v. M.

Rotala verticillaris, Linne. An Oriental species; also known from Sturt's Creek.

Ammannia auriculata, Willdenow. A tropical and sub-tropical species of the Old World; is known from the littoral tracts of Queensland.

Eucalyptus setosa, Schauer. Belongs to the littoral tracts of N.A. and Q.

Grevillea Chrysodendron, R. Brown. Confined to the littoral tracts of N.A., and tropical W.A., and of Q.

Oldenlandia alioides, F. v. M. Same distribution as the last.

Halgania integerrima, Endlicher. W.A., south-eastern interior.

Eremophila viscida, Endlicher. W.A., south-eastern interior.

Fuirena glomerata, Lamarek. Belongs to the warm regions of both hemispheres; for the most part, a littoral species in N.A., Q., and N.S.W. This is an additional genus to the flora.

Fimbristylis acuminata, Vahl. An Oriental species, reaching to Queensland.

DILLENIACEAE.

Hibbertia glaberrima, F. v. M. Mount Olga

CAPPARIDEAE.

Cleome viscosa, Linne. Glen Helen; Mount Razorback; eastend of Lake Macdonald

Capparis spinosa, Linne. Near Mount Sonder

Capparis Mitchelli, Lindley. Dashwood Creek

CRUCIFERAE.

Erysimum Blennodia, F. v. M. Near Basedow Range and W. of Eringa

Sisymbrium trisetum, F. v. M. Basedow Range; sandhills W. of Erldunda; W. of Eringa

Stenopetalum nutans, F. v. M. Bond Springs

* *Melaleuca Leucadendron*, Linne. which is widely distributed in the northern parts of the continent, extending to the Indian Archipelagos and Malayan Peninsula, has been received from between Eyre's Creek and Hergott.—F. v. M.

Menkea sphærocarpa, F. v. M. Between Mount Olga and Ayers' Rock
Capsella cochlearina, var. *ochrantha*, F. v. M. Mount Sonder
Lepidium phlebopetalum, F. v. M. Glen Helen; Basedow Range; Erldunda;
 W. of Eringa

VIOLACEAE.

Hybanthus miniatus, F. v. M. Gill's Creek

PITTOSPOREAE.

Pittosporum phillyræoides, DeCand. W. end of L. Macdonald

DROSERACEAE.

Drosera Burmanni, Vahl. Glen Farewell; Laura Vale
Drosera Indica, Linne. With the last

ELATINEAE.

Bergia perennis, F. v. M. Near Mount Sonder

HYPERICINEAE.

Hypericum Japonicum, Thunberg. Mount Sonder; W. of Macdonnell Range

RUTACEAE.

Eriostemon argyreus, F. v. M. and Tate. Near Mount Sonder

ZYGOPHYLLEAE.

Zygophyllum fruticosum, DeCand. Mount Harris
Tribulus terrestris, Linne. Mount Sonder; Ayers' Rock
Tribulus atrocarpus, F. v. M.

GERANIACEAE.

Erodium cygnorum, Nees. Scrub S.E. of Goyder Springs.
Oxalis corniculata, Linne. Mount Sonder

MALVACEAE.

Lavatera plebeia, Sims. Eringa Station
Plagianthus glomeratus, Benth. Lake Macdonald
Sida corrugata, Lindley
Sida inclusa, Benth. Horseshoe Bend; Warman Rocks
Sida cryphiopetala, F. v. M. Mount Olga
Sida podopetala, F. v. M. and Tate. Glen Helen; Warman Rocks
Abutilon otocarpum, F. v. M. Glen Helen; Blood's Range
Abutilon halophilum, F. v. M. Glen Helen; Laura Vale
Hibiscus microchlaenus, F. v. M. Bond Springs; near Mount Sonder; Laura
 Vale
Hibiscus Pinonianus, Gaudichaud. North shore of Lake Macdonald
Gossypium Sturtii, F. v. M. Orraminna rock-hole; Mount Sonder; near
 Gill's Creek; Mount Olga
Gossypium australe, F. v. M. Glen Helen; Laura Vale

STERCULIACEAE.

- Macgregoria racemigera*, F. v. M. W. end of Lake Macdonald
Brachychiton Gregorii, F. v. M. Mareena Bluff
Melhania incana, Heyne
Hannafordia Bissillii, F. v. M. "A shrub 2ft. high." Glen Edith
Commerçonia magniflora, F. v. M. A shrub 8ft. high, Mount Sonder; Mount Olga
Commerçonia Kempeana, F. v. M. Glen Edith; Watson Hills

EUPHORBIACEAE.

- Euphorbia erythrantha*, F. v. M. Sandhills, east of Lake Macdonald
Euphorbia Drummondii, F. v. M. Mount Razorback; Lake Amadeus
Euphorbia eremophila, Cunn. Emily Gapp
Phyllanthus minutiflorus, F. v. M. Glen Helen
Phyllanthus thesioides, Benth. Burt Plain
Phyllanthus lacunarius, F. v. M. Waterholes, Macdonnell Range
Phyllanthus trachyspermus, F. v. M. Mount Sonder

URTICACEAE.

- Trema cannabina*, Lour. Near Mount Sonder
Ficus platyponda, Cunn. Mount Razorback; Glen Helen

CASUARINEAE.

- Casuarina Decaisneana*, F. v. M. Watson Hills; about Lakes Macdonald and Amadeus

SAPINDACEAE

- Diplopeltis Stuartii*, F. v. M. Mount Sonder and vicinity; Mount Connor; around Lake Macdonald
Dodonaea lanceolata, F. v. M. Dashwood Creek
Dodonaea viscosa, Linne. Mount Sonder; Blood's Range; Mount Olga; N. of Ayers Range; W. of Eringa
Dodonaea microzyga, F. v. M. Between Mt. Olga and Ayers Rock; Erldunda; W. of Eringa

FRANKENIACEAE.

- Frankenia laevis*, Linne. Lakes Macdonald and Amadeus

PORTULACEAE.

- Portulaca oleracea*, Linne. Mount Razorback
Portulaca filifolia, F. v. M. Orraminna rock-hole
Claytonia ptychosperma, F. v. M. Eringa

CARYOPHYLLEAE.

- Polycarpaea synandra*, F. v. M. Dashwood Creek

AMARANTACEAE.

- Euxolus Mitchellii*, F. v. M. Orraminna; Mount Olga
Ptilotus incanus, Poiret. Mount Sonder; Glen Helen
Ptilotus exaltatus, Nees. West of Mount Sonder.
Ptilotus helipteroides, F. v. M. Table-land W. of Eringa
Ptilotus nobilis, F. v. M. Mount Sonder
Ptilotus latifolius, R. Brown. Native well at "Sandstone Rocks."
Ptilotus leucocoma, Moquin. Near Mount Sonder.

SALSOLACEAE.

- Atriplex vesicarium*, Heward. Granite rocks north of Ayers Range
Dysphania simulans, F. v. M. and Tate. Near Mount Sonder
Rhagodia nutans, R. Brown. N. side of Lake Macdonald
Chenopodium rhadinostachyum, F. v. M. Laura Vale
Kochia villosa, Lindley. Lake Macdonald; Erldunda
 var. *aphylla*. Erldunda
Kochia spongiocarpa, F. v. M. Mount Olga
Bassia sclerolænoides, F. v. M. Plains S.W. of Erldunda
Salsola Kali, Linne. Common

FICOIDEAE.

- Trianthema crystallina*, Vahl. W. end of Lake Macdonald
Trianthema pilosa, F. v. M. Mount Sonder; W. side of Lake Amadeus
Molluga hirta, Thunberg. Mount Sonder
Mulluga Cerviana, Seringe. Glen Helen

POLYGONACEAE.

- Polygonum plebeium*, R. Brown. Mount Razorback

PHYTOLACCEAE.

- Gyrostemon ramulosus*, Desfont. Glen Edith; west end of Lake Amadeus
Codonocarpus cotinifolius, F. v. M. Glen Helen; Mount Sonder; Dashwood Creek. A tree 12ft. high

NYCTAGINEAE.

- Boerhaavia repanda*, Willd. N. shore of Lake Macdonald
Boerhaavia diffusa, Linne. Mount Olga; Bond and Painta Springs

THYMELEAE.

- Pimelea microcephala*, R. Brown. S. end of Lake Amadeus

LEGUMINOSAE.

- Brachysema Chambersi*, F. v. M. Laura Vale, and west of Mount Olga
Isotropis atropurpurea, F. v. M.
Burtonia polyzyga, Benth
Crotalaria medicaginea, Lamarck. Bond Springs; Mount Sonder; Laura Vale; Mount Olga
Crotalaria dissitiflora, Benth. Laura Vale; Gill's Creek.
Crotalaria incana, Linne. Near Mount Sonder
Lotus australis, Andrews. Mount Sonder; Laura Vale; Mount Olga
Psoralea patens, Lindley. Mount Olga
Indigofera viscosa, Lamarck. Bond Springs; Mount Sonder; "Sandstone Rocks"; Warman Rocks
Indigofera hirsuta, Linne. Mounts Sonder and Leisler
Indigofera monophylla, DeCand. Laura Vale; Gill's Creek. A bush 1ft. to 2ft. high
Indigofera linifolia, Retzius. Laura Vale
Indigofera brevidens, Benth. Mount Leisler; sandhills E. of Lake Macdonald.
Clanthus Dampieri, Cunn. Erldunda and W. of Eringa.
Glycine clandestina, Wendland. Blood's Range
Glycine sericea, Benth. Glen Helen; Gill's Creek
Swainsonia coronillifolia, Salisb. Scrub S.E. of Goyder's Springs

- Swainsonia Burkei*, F. v. M. Glen Helen
Swainsonia stipularis, F. v. M. Scrub S. E. of Goyder's Springs
Kennedyia prorepens, F. v. M. Near Mount Sonder
Erythrina vespertilio, Bentham. Mount Sonder. "A tree 30ft. to 40ft. high, 1ft. to 2ft. diameter of stem; deciduous, shedding its leaves after seed-ing. The wood is exceedingly light, and is used by the natives for shields. Pod about four inches long."
Rhynchosia minima, De Candolle. Mount Sonder; Glen Helen
Vigna lanceolata, Bentham. Paint Spring; Glen Helen. Roots eaten by the aboriginals. *V. suberecta*, Bentham, is the better name of the two.
Cassia Sophera, Linn. Mount Sonder
Cassia pleurocarpa, F. v. M. Glen Helen
Cassia desolata, F. v. M. Mount Leisler; Laura Vale
Cassia phyllodinea, R. Brown. W. end of Lake Amadeus
Petalostylis labicheoides, R. Brown. Mount Sonder; Glen Helen
Acacia Bynoeana, Bentham. W. end of Lake Amadeus
Acacia spondylophylla, F. v. M. Mount Sonder
Acacia strongylophylla, F. v. M. Mount Sonder; W. end of Lake Amadeus; Mount Olga
Acacia pyrifolia, De Candolle. Gill's Creek; Laura Vale; sandhills E. of Lake Macdonald
Acacia notabilis, F. v. M. Mount Sonder; Gill's Creek
Acacia salicina, Lindley. Mount Sonder; W. end of Lake Amadeus; tableland W. of Eringa
Acacia dictyophleba, F. v. M. Sandhills N. of Mount Harris
Acacia patens, F. v. M. Mount Sonder. A shrub 5ft. to 8ft. high
Acacia acradenia, F. v. M. Mount Harris
Acacia doratoxylon, Cunningh. Twelve miles S.E. of Gill's Creek; Mount Olga; tableland W. of Eringa
Acacia aneura, F. v. M. W. of Lake Amadeus; tableland W. of Eringa
Acacia cyperophylla, F. v. M. Warman Rocks
Acacia Farnesiana, Willdenow. Mount Sonder

ROSACEAE.

- Stylobasium spathulatum*, Desfontaines. Erldunda

SALICARIAE.

- Rotala verticillaris*, Linne. West of Macdonnell Range
Ammannia multiflora, Roxburgh. Mount Sonder
Ammannia auriculata, Willdenow. Mount Sonder

HALORAGEAE.

- Haloragis aspera*, Lindley. Mount Sonder
Haloragis Gossei, F. v. M. N. side of Lake Macdonald

MYRTACEAE.

- Calycotrix longiflora*, F. v. M. Sandhills N. of Mount Harris
Thryptomene Maisonneuvii, F. v. M. Near Mount Sonder; Glen Edith; Gill's Creek; "nearly all sandhills"
Baeckea polystemona, F. v. M. Mount Harris
Eucalyptus setosa, Schauer. Laura Vale; Gill's Creek.
Eucalyptus gamophylla, F. v. M. Mount Sonder
Eucalyptus sp. Sandhills E. of Lake Macdonald

UMBELLIFERAE.

- Hydrocotyle trachycarpa*, F. v. M. Mount Olga
Didiscus glaucifolius, F. v. M. Glen Helen; Glen Edith; Mount Olga

LORANTHACEAE.

- Loranthus Exocarpi*, Behr. Near Mount Sonder
Loranthus gibberulus, Tate. Glen Helen
Loranthus pendulus, Sieber. Glen Edith; Mount Connor; W. of Eringa, &c.

PROTEACEAE.

- Grevillea Chrysodendron*, R. Brown. Glen Edith
Grevillea juncifolia, Hooker. Hoseshoe Bend; sandhills S. of Mount Rennie
Grevillea agrifolia, Cunningham. Glen Farewell; Glen Edith, and all along the Macdonnell Range
Hakea lorea, R. Brown. The variety with 'much-divided leaves. Watson Hills; Lindsay Hills
Hakea purpurea, Hooker. Sandhills between Lakes Amadeus and Macdonald

RUBIACEAE.

- Oldenlandia galioides*, F. v. M. West of Macdonnell Range
Canthium latifolium, F. v. M.
Pomax umbellata, Sonder. W. end of Lake Amadeus

CUCURBITACEAE.

- Melothria Maderaspatana*, Cogniaux. Horseshoe Bend; near Mount Sonder; Mount Olga.

COMPOSITAE.

- Brachycome ciliaris*, Lessing. Lake Amadeus
Minuria leptophylla, De Candolle. West of Eringa
Calotis plumulifera, F. v. M. West of Eringa
Calotis latiuscula, F. v. M. and Tate. Mount Olga; west of Eringa
Aster Ferresii, F. v. M. Mount Olga
Podocoma cuneifolia, R. Brown. Mount Sonder
Pluchea Eyrea, F. v. M. Glen Helen
Pterigeron liatroides, Benth. Laura Vale
Polycalymma Stuartii, F. v. M. and Sonder. West of Eringa
Bidens bipinnata, Linne. Mount Sonder
Centipeda orbicularis, Loureiro. Mount Sonder; S.E. corner of Lake Macdonald

- Glossogyne tenuifolia*, Cassini. Mount Sonder
Angianthus strictus, Benth. Near Charlotte Waters
Gnaphalium luteo-album, Linne. Painta Spring
Senecio Gregorii, F. v. M. Mount Sonder

- Erechthites lacerata*, F. v. M. Glen Farewell; Basedow Range

"Our plants agree in every respect with the one gathered by me in 1851 near Elder's Range, and described soon subsequently in the *Linnaea*.

It seems specifically distinct from the genuine *E. arguta*. In some respects it approaches *Senecio ramosissimus* and *S. odoratus*; Drummond's plant, 328, referred by Benth. to the former species, belongs, however, to *S. leucoglossus*." F. v. M.

- Helichrysum Cassinianum*, Gaudichaud. Erldunda; Eringa.

- Helichrysum Lawrencella*, F. v. M. West of Eringa.

Helichrysum semifertile, F. v. M. Granite rocks, N. of Ayers Range; west of Eringa.

Helichrysum lucidum, Henckel. South shore of Lake Macdonald

Helipterum Fitzgibboni, F. v. M. West of Eringa

CAMPANULACEAE.

Isotoma petraea, F. v. M. Crown Point; Glen Edith; Mount Olga

Wahlenbergia gracilis, De Cand. Mount Olga; Basedow Range

GOODENIACEAE.

Leschenaultia striata, F. v. M. Leaves often flat towards the base; fruit about 1½ in. long, very narrow; seeds prismatic-cubic, nearly one-tenth of an inch long, brownish outside, somewhat fringy-papillular at the margin. Mount Olga

Nelleya connata, F. v. M. Laura Vale; Warman Rocks

Goodenia grandiflora, Sims. Dashwood Creek

Goodenia fascicularis, F. v. M. and Tate. Basedow Range

Calogyne Berardiana, F. v. M. West of Eringa

Scaevola ovalifolia, R. Brown. Mount Sonder. A variety with blue flowers and verrucular-rough fruits

JASMINEAE.

Jasminum lineare, R. Brown. Bond Spring; Mount Sonder

Jasminum calcareum, F. v. M. Mount Sonder

ASCLEPIADEAE.

Cynanchum floribundum, R. Brown. Emily Gap; Glen Helen; Watson Hills

Daemia Kempeana, F. v. M. Mount Sonder; Laura Vale; Warman Rocks

Marsdenia Leichardtii, F. v. M. Mareena Bluff

CONVOLVULACEAE.

Ipomœa Muelleri, Benth. Horseshoe Bend; Bond Spring; Mount Sonder; Glen Helen

Ipomœa racemigera, F. v. M. and Tate. Glen Helen

Convolvulus erubescens, Sims. Mount Olga

Evolvulus linifolius, Linne. Glen Helen; Mount Olga

SOLANACEAE.

Solanum ferocissimum, Lindley. Bond Spring; Laura Vale

Solanum Sturtianum, F. v. M. The prickly variety. West end of Lake Macdonald

Solanum orbiculatum, Dunal. Mount Sonder

Solanum ellipticum, R. Brown. A variety with narrower leaves. Mount Sonder; Lakes Macdonald and Amadeus; granite rocks N. of Ayers Range; Mount Connor

Datura Leichardtii, F. v. M. Mount Sonder

Nicotiana suaveolens, Lehmann. Mount Sonder; Glen Edith; Gill's Creek; Laura Vale

Duboisia Hopwoodi, F. v. M. Glen Edith; tableland west of Eringa Station. "Shrub 8ft. to 10ft. high; foliage thick, very green, and fresh-looking; fatal to camels"

SCROPHULARINAE.

Buechnera linearis, R. Brown. Near Mount Sonder. Bentham already doubted the mutual specific distinctness of *B. urticifolia*, *B. linearis*, *B. tenella*, *B. grandis*, and *B. ramosissima*. Recently Schumann (*Flora von Kaiser Wilhelm's Land*, 117) proposed to unite them under the name *B. urticifolia*; but that appellation becomes particularly misleading when applied to the whole complex of forms, because even the typical plant, delineated by Bauer (*Endl. Iconogr.*, 78) shows no leaves which could be compared to those of a nettle. Far apter among R. Brown's specific designations would be that of *B. gracilis* as collective, unless the *B. Browniana* (Schinz in den *Verhandl. des Bot. Ver. v. Brandenb.* xxi., 194) just described from S.W. Africa, should prove conspecific with the Australian plant, as it would seem from the notes offered, in which case the name would be very eligible also for the species established by R. Brown. The name *Buechnera* seems first to have been correctly written by Murray in the 13th edition of Linnaeus' *Syst. Veg.* (1774); the genus was dedicated to the celebrated physician Andreas Elias Buechner, F.R.S., who was president of the Acad. Cæs. Leop. Carol. at Linnaeus' time, and who published, among other works, some on *Materia Medica*.

Stemodia viscosa, Roxburgh. A variety with narrow leaves. Mount Sonder

BIGNONIACEAE.

Tecoma australis, R. Brown. A starved variety with minute leaves. Flowers and fruits are, however, absent. "A creeper hanging 30ft. from the rocks." Mount Sonder; Gill's Creek.

PEDALINAE.

Josephinia Eugeniae, F. v. M. Watson Hills.

ACANTHACEAE.

Justicia procumbens, Linne. Orraminna; Mount Sonder; Mount Connor; W. of Eringa.

LABIATAE.

Plectranthus parviflorus, Henckel. Mount Sonder; Mount Olga
Prostanthera striatiflora, F. v. M. Mount Sonder; Glen Edith
Prostanthera Wilkeana, F. v. M. Mount Sonder; "Sandstone Rocks"
Teucrium racemosum, R. Brown. Mount Sonder
Teucrium grandiusculum, F. v. M. and Tate. Watson Hills; Gill's Creek

VERBENACEAE.

Spartothamnus teucriiflorus, F. v. M. Bond Spring; Glen Helen; about Lake Macdonald
Dicrastylis ochrotricha, F. v. M. Laura Vale
Dicrastylis Gilesii, F. v. M. Mount Connor
Clerodendron floribundum, R. Brown. Watson Hills; Laura Vale

MYOPORINAE.

Eremophila Tietkensii, F. v. M. and Tate. Mount Sonder; Laura Vale
Eremophila Bowmanni, F. v. M. Mount Olga
Eremophila Mitchelli, Bentham. Plains S.W. of Erldunda

Eremophila Paisleyi, F. v. M. The broad-leaved form, the ovulary beset with longer hairlets than usual. Plains S.W. of Erldunda; W. end of Lake Amadeus

Eremophila Freelingii, F. v. M.

Eremophila Latrobei, F. v. M. Laura Vale; Warman Rocks

Eremophila Macdonnellii, F. v. M. Samphire-swamps

Eremophila viscida, Endlicher. Between Mount Connor and Basedow Range. Endlicher gave the description from a specimen in an only commencing state of flowering. From one out of the Botanic Museum of Vienna the lithographic plate in the "Myoporinous Plants" was furnished. The example now obtained shows the flowers well developed; thus the corolla is rather above an inch long

Eremophila Gilesii, F. v. M. Warman Rocks

Eremophila maculata, F. v. M.; var. West end of Lake Amadeus; sandhills N. of Mount Harris

ASPERIFOLIAE.

Pollichia Zeilanica, F. v. M. Mount Sonder; Emily Gap. "Grows on all sandhills; camels are very fond of it."

Heliotropium asperum, R. Brown. Laura Vale; Mount Olga

Heliotropium ovalifolium, Forskael. S. side of Lake Macdonald

Heliotropium tenuifolium, R. Brown. Mount Sonder; Mount Leisler; Ayers' Rock; Painta Spring

Heliotropium fasciculatum, R. Brown. Sandhills about Lake Macdonald

Halgania integerrima, Endlicher. A variety larger in all its parts than the typic plant. Mount Harris

Cynoglossum Drummondii, Bentham

CYCADEAE.

Encephalartos Macdonelli, F. v. M. Painta Spring

LILLACEA.

Wurmbea dioica, F. v. M. Glen Edith; Gill's Creek; Laura Vale; Warman Rocks; Mount Olga

Xerotes leucocephala, R. Brown. Sandhills, Gill's Creek; Laura Vale

COMMELINEAE.

Commelina ensifolia, R. Brown. Glen Helen

FLUVIALES.

Potamageton sp. West of Macdonnell Range

ERIOCAULEAE.

Eriocaulon graphitimum, F. v. M. and Tate. West end of Macdonnell Range

CYPERACEAE.

Cyperus difformis, Linne. Glen Helen

Cyperus fulvus, R. Brown. Glen Helen

Fimbristylis communis, Kunth. Gill's Creek

Fimbristylis acuminata, Vahl. W. end of Macdonnell Range

Fuirena glomerata, Lamarck. W. end of Macdonnell Range

GRAMINEAE.

- Panicum decompositum*, R. Brown. Glen Helen
Andropogon bombycinus, R. Brown. Mount Razorback
Pappophorum commune, F. v. M. Ayers' Rock
Sporobolus actinocladius, F. v. M. Glen Helen
Danthonia bipartita, F. v. M. A variety with often only one fertile flower in the spikelet
Eleusine cruciata, Lamarek. S. shore of Lake Macdonald ; Mount Conner
Eragrostis diandra, R. Brown. Glen Helen

RHIZOSPERMAE.

- Marsilea quadrivalvis*, Linne. Mount Sonder

FILICES.

- Ophioglossum vulgatum*, C. Bauhin. Plains S.W. of Erldunda
Cheilanthes vellea, F. v. M. Mount Sonder
Cheilanthes tenuifolia, Swartz. Bond Spring; Mount Sonder; Glen Helen;
 Laura Vale; Mount Leisler; Mount Olga
Grammitis rutaefolia, R. Brown. Mount Connor

DESCRIPTIONS OF NEW SPECIES.

By Baron Sir F. von MUELLER and Professor R. TATE.

ERIOSTEMON ARGYREUS, F. v. M. and Tate.

Very lepidote all over, with narrow or elliptic-lanceolar leaves, but gathered without any flowers or fruits. Allied to *E. anceps* as far as foliage is concerned. Central Australia.

SIDA PODOPETALA, F. v. M. and Tate.

Extensively bearing a close but short indumentum; leaves rather small, on short petioles, from orbicular to lanceolar-ovate, irregularly denticulated except towards the base; stipules linear-filiform, early deciduous; penduncles mostly axillary and solitary, articulated near the flower, as long as the latter; calyx comparatively large, its lobes deltoid, shorter than the tube or nearly as long; the latter semiovate or finally almost semiglobular, faintly many-streaked; petals yellow, nearly equilateral, by about one-third longer than the calyx, slightly bilobed, the upper half much dilated, the lower half cuneated, and towards the base densely ciliolated; staminal tube short; styles numerous, only connate near the base; ovaries much beset with very short hairlets, connected into a much depressed mass, and this surrounded by a conspicuous, somewhat crenulated disk. Central Australia.

This plant has the aspect of an *Abutilon*, but its ovaries are uniovulate. The width of the expanded flowers is somewhat more than an inch. The form of the petals is rather exceptional in the genus, they being somewhat suddenly contracted into the long, almost stalk-like basil portion.

This species differs from *S. cleisocalyx* in broader and pointed leaves, in longer peduncles, and in organization of the flowers, though *S. cleisocalyx* may be dimorphous and is known to us as yet in the clandestinely flowering state only; the fruits of the two may also be different. From *S. platycalyx* our new plant is separated by narrower leaves, by the calyces being not provided with very prominent ridglets, and further by the petals emerging beyond the calyx.

CALOTIS LATIUSCULA, F. v. M. and Tate.

Erect, rather robust, beset with short scattered hairlets; leaves comparatively large, those of the branches simply sessile or with broad base somewhat clasping, from cuneate to elliptic lanceolar, flat, indented towards the summit or quite entire; headlets of flowers arranged in almost corymbose panicles, on slender peduncles: involucre bracts nearly lanceolar; floral ray yellow; solid portion of fruit almost broader than long; spinules generally nine to ten, beyond the base disconnected, few much shortened, the others about as long as the seed-bearing portion of the fruit or somewhat longer. Central Australia.

This plant has also been gathered near the Finke river by the Rev. H. Kempe. The leaves are in form similar to those of *C. cymbacantha*, while the fruits are much like those of *C. lappulacea*, but the headlets and leaves are much larger.

IPOMEA RACEMIGERA, F. v. M. and Tate.

Imperfectly beset with short hairlets; leaves small, on rather long stalks, cordate, from the conspicuously bilobed lower portion gradually narrowed into an acute apex, without any incisions or denticles, on the surface nearly glabrous; racemes as long as the leaves or longer with several flowers; pedicels much shorter than the calyx; outer sepals almost cordate towards the base, gradually acuminate; corolla small, hardly half exerted; stamens three times shorter than the corolla; style short; ovary glabrous. Glen Helen.

Branches slightly verrucular-rough. Leaves on the only and fragmentary specimen available, $1\frac{1}{2}$ in. long. Racemes possibly in amply developed inflorescences cymously arranged. Corolla white. Fruit unknown.

This is nearest *I. chrysidis*, but that plant has a cymous inflorescence, blunt sepals and a yellow corolla; the fruit of the two may also be different. In aspect the plant is also not unlike *Hewettia bicolor*.

GOODENIA FASCICULARIS, F. v. M. and Tate.

Dwarf, herbaceous, depressed, stoloniferous, almost glabrous; radical leaves linear or cuneate-lanceolar, often somewhat indented; stem-leaves quite linear, entire, the uppermost frequently fasciculated; flowers axillary and terminal, solitary, rather small; peduncles about twice as long as the flowers, bractless; lobes of the calyx very narrow, about as long as its tube; corolla yellow, beset as well as the calyx with appressed hairlets outside, all the lobes almost equally bilobed, the two upper outward scariously appendiculated; style much shorter than the corolla, bearing hairlets at and towards the summit; stigma-cover much broader than long; fruit ovate-globular, only its summit emerging; seeds surrounded by a conspicuous membrane. Basedow Range.

Near *G. heteromera*, *G. filiformis*, and *G. O'Donellii*.

TEUCRIUM GRANDIUSCULUM, F. v. M. and Tate.

Beset with spreading, very short, somewhat glandular hairlets; upper leaves sessile, flat, equally green on both sides, from rhomboid to cuneate-ovate, entire towards the base, thence serrated; floral leaves similar in form, but smaller and crowded; flowers all axillary, solitary, on short stalklets, much exceeding the floral leaves; lobes of the calyx fully as long as the tube or even somewhat longer, semilanceolar, pointed; corolla rather large, white, outside imperfectly beset with minute hairlets, its middle lobe hardly double as long as the adjacent lobes, about twice as long as broad; stamens and style nearly equalling the corolla in length; fruitlets almost ellipsoid, upwards slightly beset with hairlets. Central Australia.

Only the upper part of the plant seen. Leaves thus measuring 1 in. and gradually less in length. Corolla usually about two-thirds of an inch long, the upper lobes almost as large as the lateral lobes. Fruitlets nearly one-eighth of an inch long.

The plant when out of blooming has the aspect of a *Scaevola*. The flowers are larger than those of any other Australian species.

EREMOPHILA TIETKENSI, F. v. M. and Tate.

Branchlets robust; leaves rather large, greyish from an extremely short vestiture, elongate or narrow-lanceolar, entire but somewhat flexuous, gradually narrowed to the apex, slightly decurrent into the rather conspicuous petiole; flowers axillary, solitary; pedicel about as long as the calyx, thickened upwards; segments of the calyx lanceolar, much narrowed towards the base, overlapping at the margin, nearly glabrous, soon scarious, reticulate-venular, somewhat dotted; style glabrous; ovulary imperfectly beset with glandular very minute hairlets, ovate-globular, but the summit conically contracted; ovules four in each cell. Central Australia.

Leaves from two to three inches long, half to two-thirds of an inch broad, without any lustre; thinly keeled; the lateral venules few and faint or concealed. Calyx-segments nearly two-thirds of an inch long. Corolla and fruit unknown. Allied to *E. Clarkei*, *E. Oldfieldii*, and *E. graciliflora*, but not combinable with any of them.

*Catalogue of Geological Specimens from Central Australia, collected by W. H. Tietkens, and described by H. Y. L. Brown,
Government Geologist of South Australia.*

No. of Specimen.	Locality from which Obtained.	Description.
1	Camp 5, Billy's Gorge.....	Gneissic Granite
2	Emily Gap	
3	Glen Farewell, corkwood	Epidosite
4	Camp No. 8, chlorite	Granite (hornblende)
5	From west Macdonnell Range	Limestone coated with green carbonate of copper
6	Alice Springs	Mica
7	North side of west end Macdonnell	Quartzite
8	Mount Razorback	Iron oxide, gossany (veinstone?)
9	Foot of Mount Sonder	Quartz and kaolin (veinstone?)
10	From silver working at Mount Sonder, 18 ft. from surface	Quartz and oxide of iron (veinstone?)
11	Ditto	Kaolin
12	Mount Sonder	Limonite
13	Ditto (ironstone)	Quartzite
14	Upper rocks of Mounts Sonder and Razorback	Clay slate and iridescent iron ore
15	Chipped from a dyke, iridescent ironstone	Iridescent iron oxide
16	Ditto	Iron ochre
17	Ditto, ironstone decomposing to purple marl	Ditto
18	Ditto	Quartzose sandstone
21	Mareena Bluff, Camp 14	Fine-grained do.
22	Underlying above	Red sandstone
24	Gardiner's Range, rock formation	Quartzose sandstone
25	Rock formation, Gardiner's Range	Quartzite
26	Underlying No. 28	Ditto
28	Upper rock from escarpment at Glen Farewell	Red sandstone
29	Piece of boulder in creek at Glen Farewell	
31	Mount Solitary, sandstone	

34	Mount Sonder, iridescent iron ore	Limonite or hematite
35	Glen Edith, sandstone	Quartzose sandstone
36	Upper rock at Watson Hills	Quartzite
37	Watson Hills, lower rock	Sandstone and brown iron ore
38	Gill's Creek, sandstone	Argillaceous sandstone
39	Ditto	Travertine limestone, magnetic iron sand
40	Ditto	Sandstone
41	Gill's Creek, pebbles, sandstone, and limestone	Ferruginous sandstone
42	Coarse conglomerate from bed of creek at Glen Emily, head of Gill's Creek	Ditto
44	Gill's Creek, ironstone	Kaolin
46	Gill's Creek, limestone and kaolin	Travertine limestone conglomerate
47	Ditto	Sandstone
48	Sandstone rocks at native well	Ditto
49	Laura Vale Hills	Flint and quartzose sandstone
50		Quartzite
51		Quartzose micaceous sandstone
52		Gneissic granite
53		Shale
54		Travertine limestone
55		Ferruginous quartzite with calcite
56		Granite
57		Quartzite
58	Mount Leisler, upper rocks	Granite
59	Spinifex Plain, east of Kintore Range	Porphyry, sandstone, quartz, quartzite, slate, iron-
60	Mount Leisler, Pebbles from foot of	stone with chlorite and epidote, &c., &c.
61	Mount Leisler, kaolin	Kaolin
62	Foot of Kintore Range, Fragments from	Quartzite, claystone, quartz, chalcedony
63	Foot of Mount Leisler, clay shale	Shale
64	Upper rocks, Kintore (same as 58)	Quartzite
65	Kintore Range, rock formation	See No. 60
66	Isolated knoll S. W. end of Lake Macdonald	Quartzose sandstone (or quartzite)

Catalogue of Geological Specimens from Central Australia—continued.

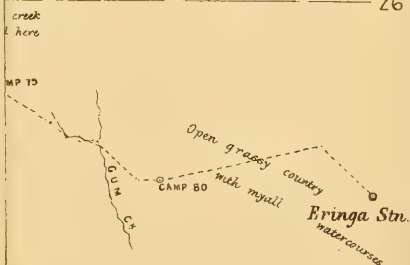
No. of specimen.	Locality from which Obtained.	Description.
70	Bonython Range	Dolomitic limestone, sandstone, flint
71	Davenport Range	Red sandstone
72	Ditto	Sandstone
73	Camp 48, Edgeup	Ditto
74	Ditto	Quartzite
75	Mount Harris, Blood's Range.....	Quartzite and sandstone
76	Long's Range, Mount Unapproachable	Quartzite
77	Tabletop, east of Long's Range	Sandstone
78	Lake Amadeus Gypsum from bed of	Gypsum
79	Mount Olga (washed from tin dish)	Waterworn stones and pebbles from a conglomerate
80	Mount Olga, black sand	
81	Foot of Mount Olga, loose pebbles	Pebbles of quartzite, hematite, granite, and other silicious and argillaceous rocks
82	Mount Olga, representative rocks	Metamorphic grit and epidote
83	Mount Olga.....	Conglomerate (argillaceous)
84	Cementing earth from stones forming the conglomerate of Mount Olga	
85	Rock formation of Ayers Rock	Metamorphic grit, conglomerate
86	Ayers Rock, excreta from cave	Bats' dung
87	Ayers Rock, granite rock formation of	Metamorphic grit, conglomerate
88	Ayers Rock, portion of pebble found in cave	Quartzose sandstone
89	Ridge one and a half miles from Mount Connor	Sandstone and quartzite
90	Basedow Ranges.....	Sandstone
91	Isolated knoll south of Basedow Range.....	Felspar, quartz, granite
92	Ditto	Graphitic granite
93	Camp 78.....	Dolerite
94	{ Same locality, black's tomahawk stone	Kaolinised granite
	{ Same locality	

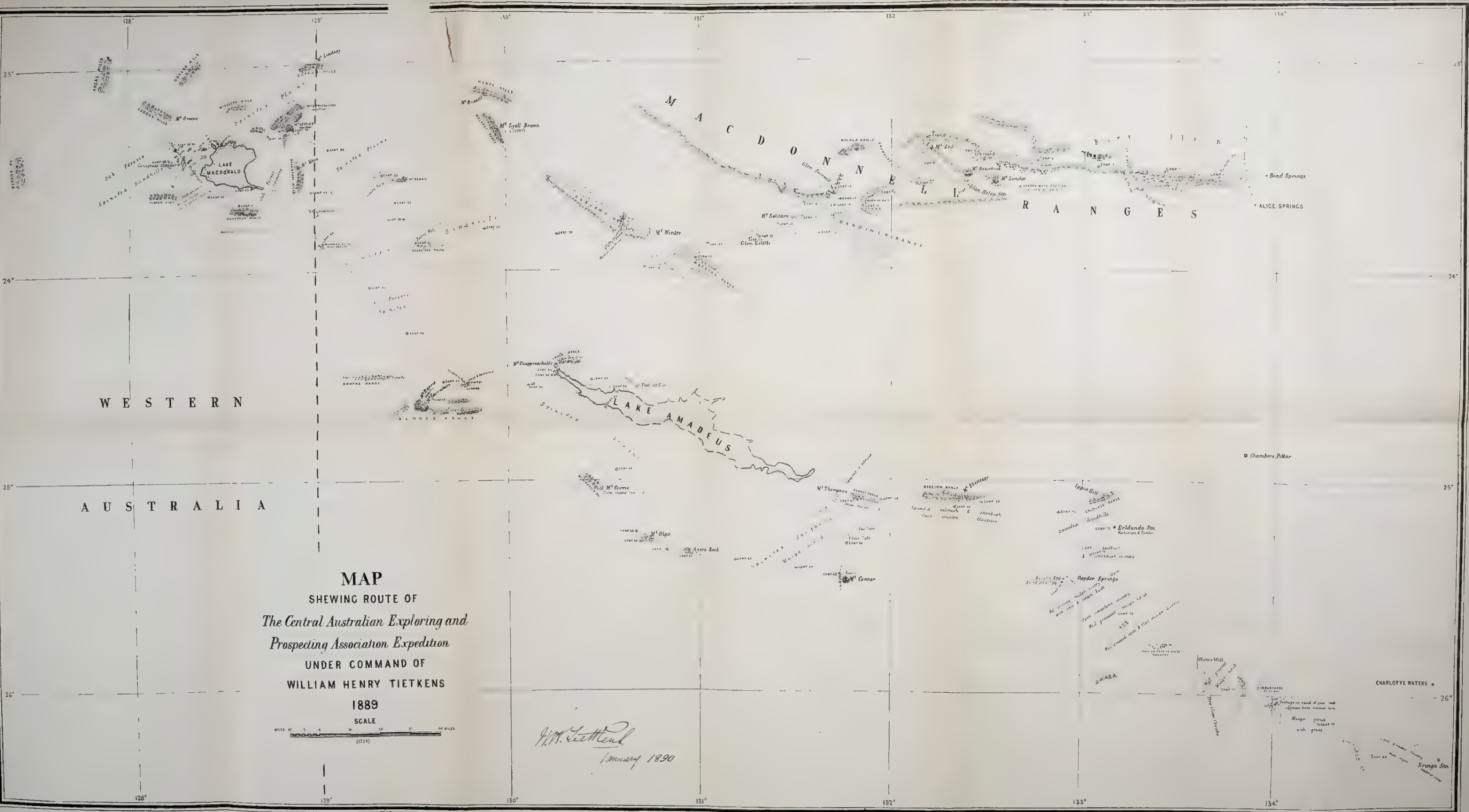
23°



CHARLOTTE WATERS

26°





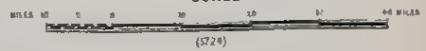
W E S T E R N

A U S T R A L I A

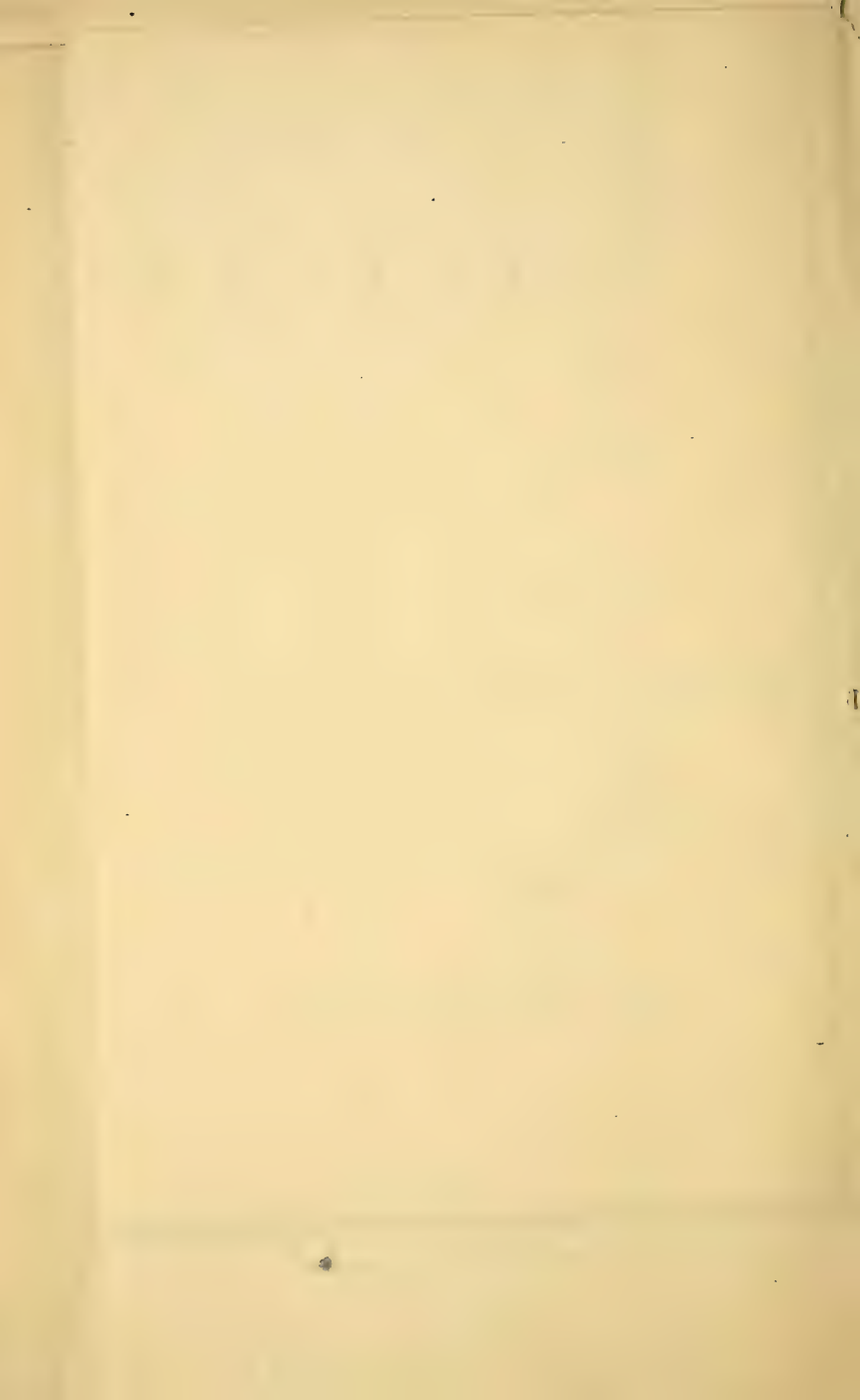
MAP
SHEWING ROUTE OF
*The Central Australian Exploring and
Prospecting Association Expedition*
UNDER COMMAND OF
WILLIAM HENRY TIETKENS

1889

SCALE



W. H. Tietkens
January 1890



O U T G O I N G R O U T E .

GEOLOGICAL SKETCH

SHOWING

SECTION OF COUNTRY WESTWARD FROM MT. SONDER IN THE MACDONNELL RANGES

AND

FROM ERLDUNDA WESTWARD TO LAKE MACDONALD.

REFERENCE :

- Recent Post Tertiary and Tertiary.
- Mesozoic (Cretaceous) Artesian Water-bearing Rocks.
- Paleozoic Devonian (?).
- Metamorphic Metal-bearing Rocks.
- Granite, Metal-bearing.

Compiled by H. Y. L. Brown, F.G.S., Government Geologist, from Rock Specimens collected by W. H. Tietkens. Positions of Formations approximate only, and may require to be amended when fuller information is obtained.

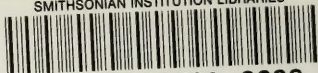
R E T U R N R O U T E .

Horizontal Scale—10 miles to 1 Inch.

Vertical Scale—4,000ft. to 1 Inch.

M. L. Kendall

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